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Annual Report — Research Activity

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We report on the fourth year of the *Marie Curie Research and Training Network* FLAVIA*net*. The report starts with summaries of the research achievements of the 11 nodes in Sect. 1. In Sect. 2 we list the publications of our network. Sect. 3 describes the presentation of our scientific results at international conferences and describes our networking activity. We discuss the economic spin-off of our research activity in Sect. 4. Finally we conclude.

1 Research Achievements

In this section we describe the scientific activity of the nodes with emphasis on the relation to the working groups and to milestones defined in Annex I of the FLAVIA*net* contract.

Node No. 1: Spain-V (Universitat de València Estudi General [UVEG])

The participants node 1 (Valencia, Spain) have worked in the following specific lines of research along the last year :

- We have extracted some ChPT low-energy constants and QCD vacuum condensates from the inclusive hadronic tau decay data, making use of QCD sum rules and taking into account the theoretical uncertainties associated with duality-violation effects [8–10].
- A study of semileptonic decays of light quarks beyond the Standard Model and with the use of an effective action has been carried out [11].
- We have performed a thorough analysis of the phenomenology involved in the Aligned Two-Higgs-Doublet model [12–15].
- We have studied the production of exotic resonances and its decay to top-antitop quark pairs at Tevatron and the LHC [16, 17]. These results are now being used by Fermilab to apply for an extension of the running of the Tevatron collider.
- We have continued developing our duality relation between loop and tree level Feynman diagrams and scattering amplitudes in quantum field theory and have extended those results to higher orders [18].
- We have contributed to the review on precision hadronic cross section measurements at low energies [19].
- We have analyzed the simplest scenario for gauge mediated supersymmetry breaking where the messenger are also the fields that generate neutrino masses [20].
- Within the Kaon working group, we have reviewed the determination of the CKM matrix element $|V_{us}|$ and the stringent tests of the Standard Model which can be performed with kaon decays [21]. In particular [22], we have given a critical overview of the different parametrizations available to extract the $K\pi$ form factor parameters which enter the determination of $|V_{us}|$.
- We have discussed the Callan-Treiman theorem and its interest in the test of the Standard Model. In Ref. [23] we have used the dispersive parametrization we proposed sometimes ago to reanalyse the $K_{\ell 3}$ data from the KTeV experiment in order to extract the $K\pi$ scalar and vector form factors with a better precision.
- We have performed [24] a chiral extrapolation of the lattice data on the scalar $K\pi$ form factor $f_0(t)$ and the ratio of the kaon and pion decay constants F_K/F_π within chiral perturbation theory to two loops.
- We are studying the $\eta \rightarrow 3\pi$ decay amplitude using dispersive methods. This will allow us to extract a fundamental Standard Model parameter, namely the quark mass ratio $Q^{-2} = (m_d^2 - m_u^2)/(m_s^2 - ((m_u + m_d)/2)^2)$ which enters predominantly this decay.

- We have performed a thorough study of holographic models of QCD that can be applied, for instance, in the study of the anomalous magnetic moment of the muon [25, 26].
- An analysis of the hadronic decays of the tau lepton has been performed. In particular we have studied decays into three pseudoscalars : $\tau \rightarrow \pi\pi\pi\nu_\tau$ [27] and $\tau \rightarrow KK\pi\nu_\tau$ [28].
- A study of the $N_F = 2$ effective actions of QCD in the lattice has been performed [29, 30].
- The study of the role of the charm quark in light flavour observables has been carried out within Lattice QCD and determinations of light pseudoscalar masses, decay constants and ChPT low-energy constants with Wilson twisted mass fermions have been obtained [31]. An unquenched determination of the kaon B_K parameter from $N_f = 2$ twisted mass lattice QCD has been also obtained [32].
- An A4 flavor model for quarks and leptons in warped geometry has been developed [33].
- We have edited the proceedings of the “International Workshop on Effective Field Theories: From the Pion to the Upsilon (EFT09) (<http://ific.uv.es/eft09>), that was held in Valencia from 2-6 February 2009 [34].

Node No. 2: Spain-B (Universitat Autònoma de Barcelona [UAB])

A study of resonance saturation has been carried out in [51]. The scattering of proton emission in the kaon-nuclei scattering was considered in [41]. On the lattice, chiral symmetry breaking was studied in [52] and the ghost-gluon coupling in [53]. Lepton flavor violation in the context of GUT theories were analyzed in [54]. The kaon bag parameter B_K was re-analyzed with twisted-mass lattice techniques in [32] and the physics of the KLOE-2 experiment was expounded in [3]. An evaluation of the CKM angle $|V_{us}|$ was presented in [21]. Novel spectroscopies of the Charmonium and Bottomonium systems were appraised in [55]. The kaon-pion vector form factor was studied in [56]. In ref. [57, 58], inclusive electromagnetic decays of heavy quarkonium were analyzed in QCD; and, in [59], the QCD static potential was studied for lower-than-four space-time dimensions. Radiative τ decays were considered in [60], while positivity constraints for the low-energy constants of the chiral Lagrangian were obtained in [61]. A new method for the combined resummation of threshold, low- and high-energy expansions for heavy-quark correlators was obtained in [62]. Finally, studies of muonic hydrogen bound states at finite temperature were done in [63] and, for the case of heavy quarkonium, in [64]. A determination of the $\Lambda_{\overline{MS}}$ parameter of QCD was made in [65] from a study of the QCD static energy; and an effective field theory for dibaryon fields was set up and studied in [66].

Node No. 3: UK (University of Durham [UDUR])

The UK node has contributed to the mission of the Working Groups 1 on kaon physics [67, 68], 2 on B -physics [69–74], 3 on tau-charm and quarkonium physics [3, 55, 75–79], 4 on analytic approaches to non-perturbative QCD [80–84] and 5 on lattice methods [85, 86].

The Durham group working with other nodes has been studying the ways in which many key processes are sensitive to new physics beyond the Standard Model, such as $B \rightarrow \pi\pi$ and $B \rightarrow K\mu\mu$ [70, 73], as well as contributing to developing tools for analyses of forthcoming LHC data [71] and upcoming neutrino oscillation experiments [87].

An important theoretical development is the application of AdS/CFT correspondence to strongly coupled QCD. Giannuzzi and Nicotri have applied this to mesons to make predictions for their masses, decay constants and couplings [80–83].

The Oxford group has continued its study of exotic hadrons, focussing on methods to determine the nature of a number of recently discovered hadrons with hidden heavy flavour that may be molecules. In [55] Close, Clark and Thomas study how many of the states recently discovered in e^+e^- colliders with the BaBar and Belle experiments might be deeply bound hadronic molecules generated by single pion exchange. Crucially tests of this explanation are outlined. In the books *Nothing: a very short introduction* [75] and *Antimatter* [76] Close explains the fascinating nature of the vacuum in modern physics and of antimatter for the general public.

The Southampton Group has continued to extend their lattice computations with chiral fermions to obtain fundamental quantities in flavour physics, in collaboration with physicists from the University of Edinburgh and the USA. The analysis of the results from the simulation with a finer lattice spacing, which is allowing the group to perform the extrapolation to the continuum limit, is complete and almost-final drafts of two important papers are currently being polished for publication: (i) a detailed simultaneous study of the chiral and continuum behaviour and (ii) an improvement of our world-leading result for the B_K parameter of $K-\bar{K}$ mixing by reducing the error due to lattice artefacts. These studies implement the new method for the non-perturbative renormalization of lattice quantities which we proposed earlier, which eliminates infra-red effects present in earlier methods by imposing the renormalization conditions only on Green functions with no exceptional momenta. This year we refined the methods further by using volume-averaged sources (to reduce the statistical errors very significantly) and twisted boundary conditions (to control the lattice artefacts which break the $O(4)$ symmetry). The improvement of our calculations of semileptonic $K \rightarrow \pi$ form factors for the precise determination of the V_{us} matrix element continues with the completion and publication of our study using the techniques developed in Southampton which do not require interpolations in the momentum transfer and containing a detailed analysis of the uncertainty in the chiral extrapolation [67]. Much of the effort of the Southampton group has been devoted to developing our project on $K \rightarrow \pi\pi$ decays with the aim of understanding the $\Delta I = 1/2$ rule and the value of ϵ'/ϵ . To this end, together with our collaborators, we have generated large course lattices to study (almost) physical decays and the first very encouraging results were presented at the 2010 Lattice Symposium and two papers are currently in preparation. This will be the main research area of the Southampton Group for next two years or so. An important by product of these studies was the first detailed study of the spectrum and mixing of the $\eta-\eta'$ system; the paper has recently been accepted for publication in Physical Review Letters [68]. We have completed and published the calculation of the decay constant of the B -meson and the amplitude for $B-\bar{B}$ mixing in the static theory [69]. Sachrajda is a member of the Flavianet Lattice Averaging Group whose first report is imminent.

The Durham group has expertise in strong coupling QCD in the continuum. A PhD student from Tübingen, Carina Popovici visited as part of her training. This resulted in the completion of work

on the three quark confinement potential [84]. Two photon production of hadronic resonances is one of the clearest ways of revealing their composition. Pennington contributed to studies for the upgrade of the DAΦNE machine with a two photon facility in the KLOE2 detector [3].

The expansion of Chiral Perturbation Theory in powers of $1/N_c$ allows the nature of low lying hadron resonances to be studied. States that are $\bar{q}q$ become more stable as the number of colours, N_c , increases, while other configurations, like tetraquark or molecular states, become wider and merge into the multi-meson continuum. Studying $\pi\pi$ scattering at one loop order in the chiral expansion sees the ρ resonance behaves with N_c just like a $\bar{q}q$ state, as expected, while the σ does not. In Ref. [78, 79], how this seemingly different nature of these states is consistent with semi-local duality. This duality works well at $N_c = 3$, but at a one loop unitarisation fails badly as N_c increases. However, the authors show that at higher orders the σ is seen to have a $\bar{q}q$ component up near 1.2 GeV, which is sub-dominant in $1/N_c$. Remarkably, this component has exactly the right structure to ensure semi-local duality holds as N_c increases. The possibility that the eighteen lightest scalars are all generated by a single $\bar{q}q$ nonet at large N_c . As N_c is reduced to its physical value, these couples increasingly to the multi-meson decay channels, dynamically generating a second set of nine states that sit close to the thresholds to which they strongly couple.

Node No. 4: Germany–South (Karlsruher Institut für Technologie [KIT-U])¹

The scientists in the node have performed theoretical research on the strong and electroweak sectors of the Standard Model and on various models of new physics. The node is further involved in activities at the BaBar, KLOE, CDF-II and BELLE experiments.

Our research on the strong interaction has addressed the development and applications of effective field theories for QCD, precise extraction of standard model parameters and effective field theories for the study of quarkonium suppression in heavy ion collisions (milestones no. 1,4) [64, 65, 88, 89]. Multi-loop calculations related to precision determinations of QCD parameters (milestone no. 3) or the rare decay $B \rightarrow X_s \gamma$ (milestone no. 15) have been performed in [90–94]. The increasing precision in the hadronic matrix element involved in the CP-violating quantity ϵ_K calls for a next-to-next-to-leading-log calculation of the corresponding Wilson coefficient. In [95] we have performed this calculation for the charm-top contribution to ϵ_K (milestones no. 9,13). Additional long distance contributions to this quantity are the focus of [96]. Soft-collinear factorisation has been applied to non-leptonic (milestone no. 10) [97] and rare semileptonic decays [98]. Further we have analysed charm effects in B meson decays [99, 100] and studied semileptonic $B \rightarrow D^*$ decays at zero recoil [101] (milestones no. 10,11,13). Narrow resonances have been studied within the radiative return method (milestone no. 12) in [102].

A large fraction of the node’s scientific activity has been devoted to physics beyond the Standard Model. Model-independent considerations comprise a new approach to characterising the parameter space of new-physics models [103] and a global fit to generic scenarios accommodating new physics in B – \bar{B} mixing [104] (milestone no. 19). It is well-known that the rich flavour structure of supersymmetric models can easily remove the tensions seen in today’s data on flavour-changing neutral current (FCNC) processes. A comprehensive analysis of these processes within the Minimal Supersymmetric Standard Model (MSSM) has been performed

¹relabelled into Node no. 12 during the reporting period

in [105] for the quark sector and in [106] for the lepton sector. We have studied $K-\bar{K}$ and $D-\bar{D}$ mixing with focus on the superparticle spectrum [107], hadronic electric dipole moments [108] and extreme values of the parameter $\tan\beta$ [105] (milestones no. 14,15,17,19). Alternative new-physics models (milestones no. 18,19) studied in our node include extensions of the Standard Model by right-handed currents [109], a second Higgs doublet [110] and a sequential fourth generation [111–113]. Further imprints of the Littlest Higgs Model with T-Parity on rare D decays (milestone no. 16) have been investigated in [114]. Important results of these studies are distinctive features of the models on FCNC processes: For example, in the right-handed current model the CP asymmetries $S_{\psi\phi}$ in the B_s system and $S_{\psi K_S}$ in the B_d system are correlated [109], and a fourth generation permits spectacular effects in CP-violating decays and rare K and B decays (milestone no. 14) as well as lepton-flavour violating decays [111–113]. These departures differ significantly from the ones found in supersymmetric flavour models, littlest Higgs model with T-parity and Randall-Sundrum model studied by us previously. Finally, in the two-Higgs-doublet model with MFV and flavour-blind phases a large CP-asymmetry $S_{\psi\phi}$ in the B_s system implies uniquely (without additional free parameters) a significant softening of the tension between the CP-asymmetry $S_{\psi K_S}$ and the parameter ϵ_K [110].

A major experimental effort of our node was the participation in the data analysis of the BELLE experiment: The NeuroBayes neural network software is currently successfully applied to the analysis of B decay data with missing energy. A major topic of our B physics activity in the CDF-II experiment at Fermilab is still the decay mode $B_s \rightarrow J/\psi\phi$ [115], which gives access to the CP phase in $B_s-\bar{B}_s$ mixing. The KLOE group has studied the cross section of $e^+e^- \rightarrow \pi^+\pi^-$ [38] in the energy region below 0.85 GeV^2 with the radiative return method and has further measured the $\eta \rightarrow 3\pi^0$ slope parameter [39]. We have further determined the $\gamma\gamma^* \rightarrow \eta_c$ transition form factor at BaBar [116].

Node No. 5: Italy (Istituto Nazionale di Fisica Nucleare [INFN])

The highlights of the research activity of the node include: **I.** Global analysis of leptonic and semileptonic kaon decay world data, in conjunction with precise lattice results on kaon form factors, finalized to extract $|V_{us}|$ and to perform several stringent tests of the Standard Model (Flavianet kaon WG, milestone n.7) [21]. Precise determination of light quark masses, light-meson spectroscopy, and K decay form factors from unquenched simulations of $N_f = 2$ twisted-mass Wilson fermions within the ETM Collaboration (milestones n. 8,9,11) [7, 7, 31, 32, 45, 47]. First results with four dynamical quarks with twisted-mass Wilson fermions [42]. **III.** Phenomenological analyses of new-physics effects in low-energy flavour physics observables in general terms [121, 122] and within specific extensions of the Standard Model. In particular, it has been analysed the correlation between CP violation in B_s and B_d mixing in models with two Higgs doublets and MFV [110, 123], as well as the effect of right-handed currents in the determination of V_{ub} and CP violation in $B_{s,d}$ mixing [109] (milestones n. 14-18). **IV.** Study of low-energy meson dynamics by means of holographic approaches to QCD [25, 26]. **V.** Development of new effective theories to describe in a coherent way the old and the newly observed hadrons with heavy quarks [124–129] (milestone n. 4). **VI.** Analysis of recent data collected

by KLOE and NA48 on K and η decays, and low-energy $e^+e^- \rightarrow$ hadrons (milestones n. 7-8) [37, 39, 40, 130–132]. Investigation of the possible physics program of an energy upgrade of the DAFNE collider [3, 133].

Node No. 6: Poland (University of Silesia [Univ. of Silesia])

The Polish node concentrated last year on milestones 6,10,12,14,15,16 and 18.

Tasks 6, 12 and 16:

The group participated in preparations of two major review publications, which gave relevant contributions to studies within these tasks. One of them [3] concerns the KLOE2 physics program, which covers subjects vital for the flavour physics in the years to come. The group contribution concentrated on the subjects related to the error reduction in calculations of the hadronic contributions to $(g - 2)_\mu$, both coming from direct measurements of the hadronic cross sections and $\gamma^* - \gamma^*$ physics. The second review paper [19] is a summary of the activity of the Working Group on Radiative Corrections and Monte Carlo Generators for Low Energies (<http://www.lnf.infn.it/wg/sighad/>). The FLAVIANet Working Group on Radiative return and Monte Carlo tools (WG6) was a part of this working group. The Polish node coordinator was one of the conveners of both working groups. In this paper achievements of the last years of the experimental and theoretical groups working on hadronic cross section measurements at the low energy e^+e^- colliders in Beijing, Frascati, Ithaca, Novosibirsk, Stanford and Tsukuba and on τ decays were presented and prospects in these fields for the years to come were sketched. The status and the precision of the Monte Carlo generators used to analyse the hadronic cross section measurements obtained with energy scans and with radiative return method as well as the ones used to determine luminosities and to simulate τ decays was reviewed in detail. The radiative corrections fully or approximately implemented in the codes and the contribution of the vacuum polarisation were also discussed.

In [102, 140] it was shown that using the radiative return method it is possible to study kaon and pion pair production at and around the narrow resonances J/ψ and $\psi(2S)$ and to explore the interference between electromagnetic and hadronic amplitudes. New charged and neutral kaon as well as pion form factors were derived, with an improved description of the data in the region of large invariant masses of the meson pair. These form factors were combined with the hadronic couplings of charged and neutral kaons to J/ψ and $\psi(2S)$ and implemented into the Monte Carlo generator PHOKHARA.

In [141] the EKHARA Monte Carlo event generator of reactions $e^+e^- \rightarrow e^+e^-\pi^0$ and $e^+e^- \rightarrow e^+e^-\pi^+\pi^-$ was presented. The newly added channel $e^+e^- \rightarrow e^+e^-\pi^0$ is important for $\gamma^* - \gamma^*$ physics and can be used for the pion transition form factor studies at meson factories. In [142] several final-state radiation models was compared. Results obtained with Monte Carlo generator PHOKHARA, relevant for an error estimation at meson factory running at $\sqrt{s} = 1$ GeV were presented.

In [143–145] a program of developing new methods and tools for calculations of the radiative corrections was pursued. An outline of a basis for planar integrals at two loops was given. Software packages Ambre and CSectors which use Mellin-Barnes and sector decomposition methods

were further developed.

Tasks 10, 14, 15:

Various aspects of B -decays were studied in [94, 146, 147]. The last missing perturbative $O(\alpha_s^2)$ corrections to $BR(B \rightarrow X_s \gamma)$ were calculated and the current status of the corrections was reviewed. In addition large- m_c asymptotic behaviour of these corrections was studied.

Task 18: Higher dimensional interaction terms appearing in Lagrangians beyond the Standard Model were considered in [148] and their complete classification without any redundancy was presented. In [149, 150] evolution of the Universe after Electroweak Symmetry Breaking was considered, which leads to the present inert phase, containing a SM-like Higgs boson and scalar dark particles, among them a Dark Matter candidate. It was shown that if current state of the Universe is described by IDM, then during the thermal evolution the Universe can pass through various intermediate phases, different from the inert one. These possible intermediate phases contain no dark matter, which appears only at the relatively late stage of cooling down of the Universe.

Node No. 7: Nordic (Lund University [ULUND])

The participants in node 7 (Lund, Sweden, Oslo, Norway, Helsinki, Finland) have contributed to working groups 1, 2 and 4 and milestones 2, 10 and 18 during this reporting period. We have worked in the following specific lines of research along the last year :

- We have continued studying hard pion Chiral Perturbation Theory where we studied $B \rightarrow \pi$ transition formfactors [152]. This extends the earlier work on $K \rightarrow \pi$ transition formfactors from node 3 and $K \rightarrow \pi\pi$ from year 2. Work is in progress on extending these results to all B decay formfactors.
- Work on a new general fit of Chiral Perturbation Theory at NNLO is progressing but no new results have been published.
- The renormalization group has been studied to high loop order for the decay constant, vacuum expectation values, form-factors and meson-meson scattering in the massive nonlinear sigma model [153].
- Dispersive methods are studied for the decay $\eta \rightarrow 3\pi$ in collaboration with node 8. This work has been presented at several conferences and a publication is forthcoming.
- Lund has started studying the extension of ChPT to the anomalous sector at NNLO for three flavours. First preliminary results have been presented at conferences but this project is still in its early stages.
- Dealing with spin-1 resonances in effective field theories in loop diagrams has uncertainties due to the additional degrees of freedom necessarily present in any Lorentz invariant description. This work, jointly with node 8, has been published in [154].

- Alternatives to the Higgs sector require in technicolour inspired scenarios theories that are nonperturbative. Here as for QCD, extrapolations to light fermion masses is needed on the lattice. We have calculated masses, vacuum expectation values and decay constants to two loop order in an effective field theory approximations for three general classes of such models with spontaneous symmetry breaking [155].
- The Oslo group has studied nonfactorizable contributions to $B \rightarrow \pi D$ decays. This is especially important for the decay $\bar{B}_d^0 \rightarrow \pi^0 D^0$ where the factorized contribution is small [156].
- The heavy light chiral quark model as studied extensively in Oslo had a too small slope in the Isgur-Wise function in $B \rightarrow D$ semileptonic decays. By changing the heavy quark propagator in the model this can be improved and the effect also has implications for the nonleptonic $B \rightarrow D\bar{D}$ decays [157].
- We have had a long term visit of S. Lanz from node 9 during which we discussed $\eta \rightarrow 3\pi$ and dispersive methods very much and in addition a paper on finite volume correction was published [158]

Node No. 8: France (Centre National de la Recherche Scientifique [CNRS])

The members of Node 8 (France) have made progress concerning the following questions in the past year. In the strong sector of the Standard Model:

- We studied in detail various aspects of the renormalization of the spin-1 resonance propagator in the effective field theory framework [154] (task 1).
- We proposed new fitting formulae for the quark mass dependence of pseudoscalar masses, decay constants and $K_{\ell 3}$ form factors and applied them to recent unquenched lattice data to constraint the pattern of $N_f = 3$ chiral symmetry breaking [162] (task 2).
- We pointed out the limitations of renormalon models recently used in the literature to model higher-order perturbation theory and discriminate between the methods for the determination of α_s using the tau spectral functions [163] (task 3).
- We studied the properties of the gauge invariant quark Green's function in two-dimensional QCD in the large N_c limit. An analytic and infrared finite solution of the exact integrodifferential equation defining the problem was possible to reach [164] (task 4).
- We determined the couplings of the Heavy Quark Effective Theory Lagrangian and heavy-light axial current, both expanded up to $1/m_b$, by matching few observables computed in HQET with their QCD counter-part [159], and we extracted from quenched lattice simulations the energy spectrum and the decay constants of the lowest B_s meson states [165–167]. (task 4).

- We studied the multidimensional Mellin-Barnes representation, a powerful tool to compute integrals of the "Feynman diagram"-type, leading to analytic continuation formulae for irreducible 2-fold Mellin-Barnes "master integrals" [50] (task 6).

In the electroweak sector of the Standard Model,

- We determined the ratio F_K/F_π in QCD with $N_f = 2 + 1$ flavors of sea quarks, based on a series of lattice calculations with three different lattice spacings, large volumes and a simulated pion mass reaching down to about 190 MeV [168] (task 7).
- We performed a chiral extrapolation of the RBC/UKQCD lattice data of the strangeness changing vector and scalar form factors and of the ratio of the kaon and pion decay constants within Chiral Perturbation Theory to two loops [24] (task 7).
- We reanalysed the KTeV K_{l3} data with a dispersive representation for the two $K\pi$ form factors, scalar and vector. The influence of the choice of the vector form factor parametrisation on the results for the scalar form factor was discussed [23] (task 7).
- We studied hadronic decays of the tau in exclusive channels using Resonance Chiral Theory: three-pion decay mode, the $KK\pi$ decay channel as well as $\tau \rightarrow (\pi/K)^-\gamma$ and $\tau \rightarrow \eta^{(\prime)}\pi^-\pi^0\nu_\tau$ [27, 28, 60] (task 7).
- We reconsidered the dispersive representation of $\gamma\gamma \rightarrow \pi\pi$ and its application to analyze the new experimental measurements by the Belle collaboration, and to deduce values of the pion dipole and quadrupole polarizabilities and the related chiral coupling constants [169] (task 8).

As far as physics beyond the Standard Model is concerned:

- We proposed two applications of the production of correlated $D\bar{D}$ pairs at BESIII, based on the angular information contained in subsequent $D \rightarrow VV$ decays, to help in the determination of the CKM matrix angle γ and the identification of new physics CP-violating effects [170] (task 16).
- We discussed different ways of extending the concept of Minimal Flavour Violation for leptoquarks, and discussed the most promising discovery channels in each case [171] (task 18).
- We analysed the recent Tevatron results on neutral meson mixing in combination with other flavour observables within the CKMfitter statistical framework, showing evidence of New Physics in $\Delta F = 2$ transitions. We analysed the resulting constraints in a model-independent parametrisation, within three different scenarios [104] (task 19).

Node No. 9: Switzerland (Universität Bern [UBERN])

- Together with node 4 and external collaborators, the Swiss node finished a project on the (O_7, O_8) –interference contribution to $B \rightarrow X_s \gamma$ at NNLO in QCD [93]. The Swiss node and node 4 (Karlsruhe) were also involved in the computation of SUSY-QCD corrections to the gluino induced contribution to $b \rightarrow s \gamma$. The results will be published within the next few months.
- Possible correlations between low-energy flavour and high- p_T observables in supersymmetric models have been explored: squarks can have large flavour-violating decay modes which are compatible with the present data from flavour physics [174].
- New observables in the exclusive decay $\bar{B} \rightarrow \bar{K}^{*0} \ell^+ \ell^-$ in which any formfactor dependence cancels out at leading order level [175, 176]. Together with several other nodes the physics case of Super-B factory has been discussed [36].
- The decay $\eta \rightarrow 3\pi$ has been analyzed on the basis of a dispersive treatment. The aim is to extract a reliable estimate of the quark mass ratio Q from the measurement of the decay rate [49].
- Finite volume effects have been studied for heavy particles like nucleons or heavy mesons [158], and for pions at finite lattice spacing for twisted-mass QCD [177].
- The gradient flow in non-abelian gauge theories has some remarkable and perhaps unexpected properties [178]: in particular, it maps the fundamental gauge field to a smooth renormalized field and may therefore be used to study these theories from short to long distances. Some new insight can be gained into the possible causes of the rapid slowing-down of current QCD simulations when the lattice spacing is reduced [179].
- Global symmetries of the Yang-Mills theory on the lattice have been exploited to design a new computational strategy for extracting glueball masses and matrix elements which achieves an exponential reduction of the statistical error with respect to standard technique. The topological susceptibility for the SU(3) Yang-Mills theory is computed in the continuum limit with a precision of about 2% by using the definition of the charge suggested by Neuberger fermions for two values of the negative mass parameter s .
- The first paper of the FLAVIANet Lattice Averaging Group (FLAG), providing a review of lattice results concerning low-energy particle physics has been published just after the end of the FLAVIANet period. The paper condenses the activity of members of several different nodes and of more than two years of work and represents one of the successes of the network.

Node No. 10: Austria (Universität Wien [UNIWIEN])

The work of this node addressed milestones no. 1,2,5,7,8,11,18, spanning the topics of working groups 1,2,4,5.

The Vienna group has contributed to a global analysis [21] of leptonic and semileptonic kaon decay data, including all data of recent experiments. This analysis, in conjunction with precise lattice calculations of the hadronic matrix elements now available, leads to a very precise determination of V_{us} and allows stringent tests of the Standard Model. Further members of this group have also contributed to a review article on physics with the KLOE-2 experiment at the upgraded DAΦNE [3].

Analytic approximations of chiral $SU(3)$ amplitudes for the extrapolation of lattice data to the physical masses have been proposed in [180]. The method allows the determination of NNLO low-energy constants in a controllable fashion. The approach was tested with recent lattice data for the ratio F_K/F_π of meson decay constants.

A new algorithm for obtaining the effective continuum threshold in vacuum-to-boundstate correlators was formulated in [181]. These correlators are the basic objects for the calculation of hadron form factors in the method of light-cone sum rules in QCD. The application of the new algorithm considerably enlarges the range of the momentum transfer where the form factor may be extracted from the correlator. In [182] the extraction of the ground-state decay constant from the two-point correlator in QCD and in potential models are compared. The results suggest that in QCD a Borel-parameter dependent threshold leads to a more reliable and accurate determination of bound-state characteristics by the method of sum rules. These methods were subsequently applied to the determination of the decay constants of heavy pseudoscalar mesons from QCD sum rules [183].

A large part of the studies performed by the Slovenian group of this node was devoted to physics beyond the Standard model: Lepton flavour violation in the presence of a low-scale seesaw of type I + III was studied in [184]. The importance of flavour effects in models where leptogenesis proceeds via the decay of Majorana electroweak triplets was analyzed in [185].

The measured forward-backward asymmetry in the $t\bar{t}$ production at the Tevatron might be explained by the additional exchange of a coloured weak singlet scalar which appears in some grand unified theories. The phenomenological consequences of such a scenario were analyzed in two recent publications [186, 187].

The contributions of non-standard tbW effective operators to the decay of an unpolarized top quark into a bottom quark and a W gauge boson at next-to-leading order in QCD were discussed in [188].

The viability of generic Higgsless models at low energies was investigated [137] imposing constraints from electroweak precision observables and unitarity constraints up to the TeV scale. The analysis showed that a consistent picture can be obtained by introducing a single vector state (with a mass below 1 TeV) and an axial state with $1.2m_V \leq m_A \leq 1.4m_V$.

Within the Standard Model, the tree-level contributions to the rare decays $B^+ \rightarrow \pi^+\nu\bar{\nu}$, $B^+ \rightarrow K^+\nu\bar{\nu}$ and $B^+ \rightarrow K^{*+}\nu\bar{\nu}$ were analyzed and compared to those occurring in $K^+ \rightarrow \pi^+\nu\bar{\nu}$, $D^+ \rightarrow \pi^+\nu\bar{\nu}$ and $D_s^+ \rightarrow \pi^+\nu\bar{\nu}$. It was found that the tree-level contributions account for 98%, 12% and 14% of the total $B^+ \rightarrow \pi^+\nu\bar{\nu}$, $B^+ \rightarrow K^+\nu\bar{\nu}$ and $B^+ \rightarrow K^{*+}\nu\bar{\nu}$ rates, respectively.

The Standard Model predicts highly suppressed flavour changing neutral current processes of

the top quark ($t \rightarrow cV$, $V = Z, \gamma, g$), while new physics in many cases lifts this suppression. The branching ratios of these rare decays mediated by effective flavour changing neutral current couplings at next-to-leading in QCD were calculated [189, 190], including the effects due to operator mixing.

A search for signals of weak annihilation in inclusive D decays was presented [191]. Both the widths and the lepton energy moments, which are quite sensitive probes, were considered. The analysis of Cleo data showed no clear evidence of weak annihilation and allowed to put bounds on their relevance in charmless B semileptonic decays.

It was shown [192] that the ratios of tree and penguin amplitudes in $B \rightarrow K^+\pi$ and $B \rightarrow \rho K$ are 2 to 3 times larger than in $B \rightarrow K\pi$. This allows for considerably larger CP asymmetries in the former processes than the 10 % asymmetry measured in $B^0 \rightarrow K^+\pi^-$.

The question whether the lightest scalar mesons σ and κ contain a large tetraquark component $\bar{q}q\bar{q}q$ was investigated [193, 194]. A search for possible light tetraquark states with $J^{PC} = 0^{++}$ and $I = 0, 2, 1/2, 3/2$ was performed. Apart from the lowest scattering states, additional light states in the $I = 0$ and $I = 1/2$ channels were found, which can be interpreted as the observed resonances σ and κ with a sizable tetraquark component.

In [195], the pion quark-wavefunctions in the Nambu-Jona-Lasinio model and in quenched lattice QCD were examined. It turned out that the results agree remarkably well in all channels.

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We extracted low energy constants of the effective chiral Lagrangian and derived quantities, such as the light quark mass, with high precision, using maximally twisted mass fermions for two mass-degenerate quark flavours [7]. We used four values of the lattice spacing, spatial lattice extents ranging from 2.0 fm to 2.5 fm and pseudo scalar masses in the range 280 MeV to 650 MeV and extrapolated to the continuum and infinite volume limits. First results are also obtained with 2+1+1 dynamical quarks [31,46]. In the used formulation of lattice QCD, systematic effects due to isospin breaking were investigated with the help of the associated low energy effective theory [212]. Also an alternative to extract low energy constants was studied [213] and seen to be feasible. It uses lattice simulations in the epsilon regime.

The non-perturbative improvement and renormalization of the quark mass in $O(a)$ -improved lattice QCD is determined [86] and it is applied in a comprehensive test of HQET, a publication which is presently being finished. In a series of papers [165, 166, 206] a fully non-perturbative treatment of HQET including $1/m$ corrections was carried out for the first time. This lattice gauge theory computation is in the quenched approximation but the continuum limit is taken. The quark mass [166], the spectrum [165] and the B_s decay constant [206] (including the excited state) are computed with good precision. It turned out that the $1/m_b$ corrections are very small. In the next couple of years, these techniques will be applied including the effects of dynamical fermions. Ref. [86] is an intermediate step and first results for physics observables have been presented at this years lattice conference.

A chiral perturbation theory investigations estimates the quark-disconnected diagrams contributing to the hadronic vacuum polarisation for the Muon $g-2$ [205]. It will help to complement

lattice efforts, where the quark-disconnected contributions have comparatively large statistical errors.

An important source of uncertainties in lattice gauge theory computations is the autocorrelation present in the “measurements” at different Monte-Carlo times from the same Markov chain. The associated critical slowing down of QCD simulations was analysed in detail [207, 211] and an improved error treatment was found.

The strong coupling at high energy scale is an important input parameter for many analysis in flavour physics and QCD in general. Its determination from lattice gauge theory through a recursive finite size technique is particularly clean and perturbative uncertainties can be reduced to a minimum. The running of the coupling in the Schrödinger functional scheme was non-perturbatively computed with four massless quarks – a milestone on the way to the desired 5-flavour coupling at the Z-scale, since the b-quark represents a small effect which can safely be incorporated by perturbation theory.

The electric dipole form factors of neutron and proton have been studied in U(3) chiral perturbation theory at next-to-leading order [198]. In particular, improved results for chiral extrapolation of lattice results are discussed.

The Lüscher formalism has been generalized to study the extraction of the resonance matrix elements on the lattice [199]. In particular, assuming that the effective range expansion is convergent in the resonance region, a procedure for the extraction of the resonance pole position on the complex plane is discussed. It is shown that, applying essentially the same procedure in the presence of the external field, it is possible to extract the resonance formfactor at the zero momentum transfer in a finite-volume. A high-accuracy calculation of π^- -deuteron scattering at threshold allows for the most precise determination yet of the pion-nucleon scattering lengths from a combined analysis of pionic hydrogen and pionic deuterium atoms [200].

In [201], a procedure for the extraction of the resonance parameters on the lattice, alternative to Lüscher’s approach has been proposed. In particular, it is shown that in the presence of an isolated low-lying resonance the Euclidean two-point function displays an universal behavior characterized by the energy and width of the resonance. Consequently, the latter can be extracted directly from the fit of the measured two-point function at finite (not asymptotically large) times. We have calculated radiative corrections to the flavor-changing neutral current process $K \rightarrow \pi \ell^+ \ell^-$ [202]. The validity of the soft-photon approximation as well as the necessity of additional phase space cuts for the electron-positron final states are discussed in detail.

We use non-relativistic effective field theory to analyze the effects of pion-pion final-state interactions on the Dalitz plot parameters of $\eta \rightarrow 3\pi$ decays [203]. For the slope parameter of the neutral channel, we find $\alpha = -0.025 \pm 0.005$, in marginal agreement with experiment. We point towards a possible inconsistency between neutral- and charged-channel Dalitz plot parameters as experimentally determined by KLOE.

The custodial Randall-Sundrum Model has been investigated in detail [214, 216]. A systematic factorization analysis has been performed for the $\bar{B} \rightarrow X_s \gamma$ photon spectrum in the endpoint region $m_b - 2E_\gamma = \mathcal{O}(\Lambda_{\text{QCD}})$ [215]. The determination of V_{ub} from $B \rightarrow X_u l \nu$ decays has been improved by including NNLO QCD corrections [217].

Members of the node participate in the Flavianet Lattice Averaging Group which is presently finishing its first report.

2 Publications

During the reporting period the FLAVIA $_{net}$ members wrote the scientific papers listed in the following subsection. Only papers which are published in a refereed journal or submitted for publication are listed with one exception: In the case of our ESR and ER we also list unrefereed papers. Publications unrelated to the topics mentioned in Annex I of the FLAVIA $_{net}$ contract are not included. Experimental papers are only listed if FLAVIA $_{net}$ members were involved in the presented analyses. We list joint publications involving several FLAVIA $_{net}$ nodes in Sect. 3.5. A special subsection is devoted to the papers written by the ESR and ER funded by FLAVIA $_{net}$.

2.1 Publications of all FLAVIA $_{net}$ members

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2.2 Publications of ER and ESR

The ER and ESR of the network have written the scientific papers listed below. The last two columns of the tables distinguish between the papers submitted to refereed journals and non-refereed publications.

Flavianet fellows whose time of employment overlapped with the reporting period:

Name		refereed	non-refereed
Emilie Passemar	ER	[3, 21, 23, 24]	[22, 49]
Zhi-Hui Guo	ESR		[60, 61]
Michael Donnellan	ESR		[218, 219]
Clark Downum	ESR		[220]
Stefano Nicotri	ESR	[83]	[80]
Floriana Giannuzzi	ESR		[81, 221]
Jacobo Ruiz de Elvira	ESR		[222]
Emiliano Molinaro	ESR	[87]	
Patrick Fritzscht	ESR	[86]	

David Palao	ESR	[7, 31]	[42, 48]
Sergiy Ivashyn	ESR	[142, 223]	[141]
Ilaria Jemos	ESR	[152, 224]	[225, 226]
Alberto Ramos	ER	[168]	[227]
Ruben Garcia Martin	ESR		[169, 228]
Simone Bifani	ESR	[132]	
Martin Zdrahal	ESR		[229]
Pere Masjuan	ESR	[180]	[230]
Pablo Roig	ESR	[19, 27]	[60, 231, 232]
Francesco Virota	ESR		[211, 233]

Flavianet fellows who were employed prior to the reporting period:

Name		refereed	non-refereed
David Greynat	ER	[50, 62]	
Maximilian Stahlhofen	ESR	[59]	[234]
Javier Virto	ESR		[36]
Jernej Kamenik	ER	[185, 186, 189–191, 235]	[5, 137, 187, 188, 236]
Miguel Escobedo	ESR	[63, 64, 237, 238]	
Renata Jora	ESR	[239, 240]	[241]
Vicent Mateu	ESR		[242–244]

3 Conferences, Workshops and General Networking

The FLAVIA*net* nodes have organised several events devoted to common research and scientific exchange. The major meetings were the *Euro-Flavour09* in Bari and *Euro-Flavour10* in Munich. These conferences are described in the following two sections. Sect. 3.3 summarises other conferences and workshops organised at one of the nodes, if they were totally or in part devoted to flavour physics. Sect. 3.4 is devoted to other conferences and workshops, at which results from FLAVIA*net* were presented. In Sect. 3.5 we summarise the individual networking activity related to research.

3.1 Euro-Flavour 09

The conference *Euro-Flavour09* took place in Bari, Italy. There were 58 participants, giving 41 talks in total. The talks are listed in the table below.

Speaker	Talk title
Johan Bijnens	<i>Kaon physics: recent results</i>
Simone Bifani	<i>Recent Results from the NA48/NA62 Experiments</i>

Ilaria Jemos	<i>Fitting Low Energy Constants at Next to Next to Leading order in Chiral Perturbation Theory</i>
Pere Masjuan	<i>Chiral Dynamics Predictions for $\eta' \rightarrow \eta\pi\pi$</i>
Emilie Passemar	<i>A new dispersive analysis of $\eta \rightarrow 3\pi$</i>
Karol Kampf	<i>$\eta \rightarrow 3\pi$ in the dispersive approach</i>
Marian Kolesar	<i>$\eta \rightarrow 3\pi$ in Resummed CHPT - methods and first preliminary results</i>
Michele Della Morte	<i>Heavy flavors on the lattice. Challenges and (some) new results</i>
Gilberto Colangelo	<i>Status report of the FLAG activities</i>
Gregory Vulvert	<i>Light hadron spectrum from lattice QCD</i>
Alberto Ramos	<i>The ratio $\frac{f_K}{f_\pi}$ in QCD</i>
Zhi-Hui Guo	<i>The extrapolation of the pion and kaon decay constants from resonance chiral theory to the lattice analysis</i>
Javier Virto	<i>B physics - theory review</i>
Concezio Bozzi	<i>B physics : experimental status and perspectives</i>
Sebastien Descotes-Jenon	<i>The two-Higgs doublet model of type II facing flavour physics data</i>
Sven Faller	<i>$B_d \rightarrow J/\psi K_s$ and $B_s \rightarrow J/\psi \phi$</i>
Laurent Lellouch	<i>Model independent description of $B \rightarrow \pi \ell \nu$ decays</i>
Dominik Scherer	<i>$\tan(\beta)$ enhanced SUSY corrections beyond the decoupling limit</i>
Lars Hofer	<i>Gluino mediated FCNCs in the MSSM with large $\tan(\beta)$</i>
Yu-Ming Wang	<i>$\Lambda_b \rightarrow p\pi, pK$ decays in k_T factorization</i>
Henryk Czyz	<i>Review of MC Methods and Radiative Return</i>
Antonio Pich	<i>Flavour constraints on multi-Higgs models</i>
Stefan Recksiegel	<i>Flavour Physics in the Littlest Higgs Model with T-Parity: Effects in the K, B and D systems</i>
Barbara Sciascia	<i>Status report from the Kaon Working Group</i>
Juan Jose Sanz Cillero	<i>Renormalization schemes in the SS-PP correlator at NLO in $\frac{1}{N_c}$</i>
David Wilson	<i>Schwinger-Dyson equations of the gauge sector of QCD</i>
Stefano Nicotri	<i>Finite temperature behaviour of scalar hadrons from a holographic description</i>
Antimo Palano	<i>New states in the open charm sector</i>

Nora Brambilla	<i>Review of quarkonium</i>
Simone Stracka	<i>Experimental results on quarkonium</i>
Diogo Boito	<i>$K\pi$ form factors and final state interactions in $D^+ \rightarrow K^- \pi^+ \pi^+$ decays</i>
Pablo Roig	<i>Hadronic decays of the τ lepton into 3π and $KK\pi$ modes</i>
Maximilian Stahlhofen	<i>The QCD Static Potential in 2+1 Dimensions</i>
Floriana Giannuzzi	<i>Heavy hadron spectrum by an AdS/QCD potential</i>
Jennifer Girrbach	<i>Lepton Flavour Violation in the MSSM at large $\tan(\beta)$</i>
Katia Fratini	<i>First results from the MEG experiment</i>
Andreas Crivellin	<i>A-terms and a right-handed W coupling</i>
Maria Valentina Carlucci	<i>B_s physics in the Standard Model and in a scenario with a single Universal Extra Dimension</i>
Martin Gonzalez-Alonso	<i>New Physics bounds from CKM-unitarity</i>
Matthaeus Bartsch	<i>CP Violation in $B \rightarrow V_L V_L$</i>
Wei Wang	<i>Probing the structure of light scalar mesons from B meson decays</i>

The detailed schedule can be found at <http://www.ba.infn.it/euroflavour2009>. We devoted a session to each of the Working Groups: Kaon physics, B -physics, tau-charm physics, Lattice methods and results, Monte Carlo methods and tools, and Analytic approaches to QCD. Each session began with a review of progress in the field, and where appropriate the interplay of theory and experiment, as well as presenting open issues.

3.2 Euro-Flavour 10

The conference *Euro-Flavour10* took place in Munich, Germany. There were 101 participants, giving 58 talks in total. The talks are listed in the table below.

Speaker	Talk title
Andrzej Buras	<i>Introduction to flavour physics</i>
Gilberto Colangelo	<i>Results from Flavianet: FLAG</i>
Wolfgang Altmannshofer	<i>B physics review theory</i>
Andreas Crivellin	<i>B physics review theory</i>
Thomas Kuhr	<i>Recent Experimental B Physics Results</i>

Rainer Sommer	<i>Perturbative and non-perturbative uncertainties in HQET-QCD matching</i>
Joachim Brod	<i>Rare K Decays and $\epsilon(K)$: Theory Prediction</i>
Bastian Kubis	<i>Rescattering effects in $\eta \rightarrow 3\pi$ decays</i>
Gino Isidori	<i>Precise tests of the Standard Model with data on leptonic and semileptonic kaon decays (Review talk WG Kaon)</i>
Nils Offen	<i>On renormalization of heavy-light light ray operators</i>
Carina Popovici	<i>Coulomb gauge confinement in the heavy quark limit</i>
Stefania Gori	<i>Higgs mediated flavour changing neutral currents</i>
Christoph Promberger	<i>Flavour Violation in the Presence of a Fourth Generation</i>
Ilaria Jemos	<i>Hard Pion Chiral Perturbation Theory for $B \rightarrow \pi$ and $D \rightarrow \pi$ form factors</i>
Andrey Tayduganov	<i>Determining the photon polarization of the radiative $B \rightarrow K_1(1270)$ gamma decay</i>
Andre Hoang	<i>Charm quark mass from relativistic sum rules</i>
Giulia Ricciardi	<i>Resummed Massive spectra in Heavy quark decays</i>
Joaquim Matias	<i>New Physics reach of the decay mode $B \rightarrow K^*l^+l^-$</i>
Bachir Moussallam	<i>MO analysis of new Belle results on photon-photon scattering with chiral constraints</i>
Guillaume Toucas	<i>Lattice hints of a strong dependence of pseudoscalar observables on the strange quark mass</i>
Marian Kolesar	<i>$\eta \rightarrow 3\pi$ in Resummed CHPT</i>
Ignasi Rosell	<i>The Vector Form Factor within Resonance Chiral Theory: estimation of L_9</i>

Bertrand Echenard	<i>WG3 tau/charm & quarkonium review: Exploring the world of heavy quarkonium</i>
Yukinari Sumino	<i>QCD potential at three-loop order</i>
Pablo Roig-Garces	<i>Precise determination of the η_c mass and width in radiative J/Ψ decays</i>
Svjetlana Fajfer	<i>Light colored scalars and the low energy phenomenology</i>
Pedro Ruiz-Femenia	<i>Electroweak non-resonant corrections to top-pair production close to threshold</i>
Vicent Mateu	<i>Thrust at N^3LL with Power Corrections and a Precision Global Fit for α_s</i>
Jacopo Ghiglieri	<i>Heavy quarkonium spectrum and width in a weakly-coupled quark-gluon plasma</i>
Maximilian Stahlhofen	<i>The QCD static potential in 2+1 dimensions</i>
Diogo Boito	<i>$K\pi$ vector form factor constrained by τ and K_{l3} decays</i>
Benoit Blossier	<i>Quark masses from $N_f = 2$ simulations</i>
Michael Donnellan	<i>The $B^* B\pi$ coupling</i>
Antonin Portelli	<i>Electromagnetic corrections to light hadron masses in lattice QCD+QED</i>
Jie Lu	<i>QCD-like Theories at Next-to-Next-to-Leading order</i>
David Palao	<i>Non-perturbative computation of renormalization constants of bilinears operators with 4 dynamical flavours</i>
Alberto Ramos	<i>The octet baryon sigma term</i>
Henryk Czyz	<i>Review of WG Radiative return and Monte Carlo tools</i>
Floriana Giannuzzi	<i>Production-decay interferences in s-channel single-top production at NLO QCD</i>
Johan Bijnens	<i>Status of the new L_i^r fit at order p^6</i>

Paula Tuzon	<i>Low energy constraints on the aligned two-Higgs-doublet model</i>
Lisa Carloni	<i>Leading Logarithms and Renormalization of massive $O(N)$</i>
Juan Jose Sanz-Cillero	<i>Scalar and Pseudo-scalar correlators in $1/N_c$</i>
Zhi-Hui Guo	<i>Phenomenology study from $U(3)$ chiral perturbation theory</i>
Karol Kampf	<i>Light-meson decays</i>
Stefan Lanz	<i>A new dispersive analysis of $\eta \rightarrow 3\pi$</i>
Gino Isidori	<i>Quark flavour mixing with right-handed currents: an effective theory approach</i>
Jacobo Ruiz de Elvira	<i>Structure of the lightest scalar meson from the $1/N_c$ expansion of unitarized Chiral Perturbation Theory and Regge behavior</i>
Pere Masjuan	<i>Analytical Approximations for the extrapolation of lattice data</i>
David Greynat	<i>Resummation of Threshold, Low- and High-Energy Expansions</i>
Stefano Nicotri	<i>Properties of heavy quarks at finite temperature and density in a holographic approach</i>
Samuel Friot	<i>Analytic continuation of integrals of the "Feynman diagrams"-type from multidimensional Mellin-Barnes representation</i>
Oscar Cata'	<i>Holography and the muon (g-2)</i>
Laurent Lellouch	<i>Nonperturbative 2+1 flavor QCD at the physical point: determining the light quark masses</i>
Christopher Sachrajda	<i>Prospects for Lattice Calculations of Nonleptonic Kaon Decays</i>
Andreas Weiler	<i>Flavour Physics beyond the SM</i>
Cristoforo Simonetto	<i>Review of Lepton Flavor Violation</i>

Chris Quigg	<i>Future Approaches to Flavour Physics</i>
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Furthermore, the following ESR and ER members of the network have participated in the conference: Emilie Passemar, Nils Offen, David Greynat, Ilaria Jemos, Martin Zdrahal, Vicent Mateu, Francesco Virota, Michael Donnellan, Maximilian Stahlhofen, Patrick Fritzs, Alberto Ramos, Zhi-Hui Guo, Stefano Nicotri, Pablo Roig, David Palao, Pere Masjuan, Floriana Giannuzzi, Jacobo Ruiz de Elvira, and Carina Popovici.

The detailed schedule can be found at <http://euroflavour2010.ph.tum.de>. We devoted a session to each of the Working Groups: Kaon physics, B -physics, tau-charm physics, Lattice methods and results, Monte Carlo methods and tools, and Analytic approaches to QCD. Each session began with a review of progress in the field, and where appropriate the interplay of theory and experiment, as well as presenting open issues.

3.3 Conferences and workshops within FLAVIANet

Several conferences and workshops took place in the FLAVIANet nodes. Here we list both genuine FLAVIANet meetings and international conferences and workshops organised by FLAVIANet members at their home institutions.

Node no.	Conference/Workshop
1,2	<i>Chiral10 WORKSHOP</i> , June 21-24, 2010. Valencia, Spain. http://ific.uv.es/nucth/chiral10/
3	FLAVIANet meeting, Southampton, UK, 14-15 December 2009. <i>Flavour physics with the Relativistic Heavy Quark action</i> http://www.hep.phys.soton.ac.uk/ctslx
3	<i>Annual UK Particle Theory Meeting</i> , 17-19 December 2009, Durham (UK) http://www.ippp.dur.ac.uk/Xmas/09/
3	<i>Higgs-Maxwell Meeting</i> , 10 February 2010, Edinburgh (UK) http://www.ippp.dur.ac.uk/Workshops/10/HMW/
3	Workshop on Theory Experiment interplay at LHC, London, 8-9 April 2010 http://www.ippp.dur.ac.uk/Workshops/10/Th-Exp-LHC/
3	BOOST 2010, Oxford, 22-25 June 2010 http://www.physics.ox.ac.uk/boost2010/
3	<i>Tools 2010, Tools for SUSY and the new physics</i> , Winchester, 29 June-2 July, 2010 http://www.next-institute.ac.uk/TOOLS2010
3	CKM2010: 6th International Workshop on the CKM Unitarity Triangle, Warwick, 6-10 September 2010 http://www2.warwick.ac.uk/fac/sci/physics/research/epp/meetings/ckm2010
3	<i>Lattice meets Phenomenology</i> , Durham 15-17 September 2010 http://www.ippp.dur.ac.uk/Workshops/10/latticephenomenology

3	<i>iNEXT: the NEXT phase of particle physics</i> , Brighton, 23-24 September 2010 http://pact.phys.susx.ac.uk/inext/
4	<i>Out-of-Equilibrium Quantum Fields in the Early Universe</i> , 6-8 Sep 2010, Aachen (Germany) http://tpe.physik.rwth-aachen.de/workshops/noneq/Main.html
5	<i>Rencontres de Physique de la Vallée d'Aoste</i> , 28th Feb. – 6th March 2010, La Thuile (Italy), http://www.pi.infn.it/lathuile
5	<i>Third Workshop on Theory, Phenomenology and Experiments in Heavy Flavour Physics</i> , 5h Feb. – 7th July 2010, Capri (Italy), http://web.infn.it/caprifp2010/
5	<i>Indirect Searches for New Physics at the time of LHC</i> , 15h Feb. – 26th March 2010, GGI, Florence (Italy), http://www.ggi.fi.infn.it/
8	<i>Colloquium in memory of Jan Stern</i> , 2-3 October 2009, Paris (France) http://confjstern.in2p3.fr/
8	<i>ICHEP 2010: International Conference on High-Energy Physics</i> , 22-28 July 2010, Paris (France) http://www.ichep2010.fr/
9	<i>Working group on the interplay of collider and flavour physics</i> 14-16 Dec 2009, CERN (Switzerland)
9	“The New, the Rare and the Beautiful”, Workshop at University of Zurich 7-9 Jan 2010, Zurich, Switzerland
9,11	<i>Future directions in lattice gauge theory 2010</i> , 19 Jul - 13 Aug 2010, CERN (Switzerland) http://phdepth.web.cern.ch/phdepth/content2/THInstitutes/2010/LGT1
10	<i>6th Vienna Central European Seminar on Particle Physics and Quantum Field Theory: Effective Field Theories</i> , 27th - 29th November 2009, Vienna (Austria) http://www.univie.ac.at/vienna.seminar/2009/index.html

3.4 Other conferences and workshops

Below we list the international conferences and workshops at which FLAVIA_{net} researchers have presented their scientific results. Several of these conferences were attended by a large number of FLAVIA_{net} members and were used for networking.

Name	Node no.	Conference/Workshop <i>talk title</i>
Isabella Bierenbaum	1	10th DESY Workshop on Elementary Particle Theory: Loops and Legs in Quantum Field Theory, Wörlitz, Germany, 25-30 April 2010. <i>Toward a loop-tree duality at two loops</i>

Oscar Catà	1	QCD@Work, International Workshop on QCD - Theory and Experiment, Martina Franca, Italy, 20-23 June 2010. <i>Antisymmetric tensors in holographic QCD</i> LC2010, Light Cone 2010, Valencia, Spain, 14-18 June 2010. <i>2-forms in holographic QCD</i> Quark Confinement and the Hadron Spectrum IX, Madrid, Spain, August 30 - September 3, 2010. <i>Holography and the muon (g-2)</i>	
Paola Ferrario, Germán Rodrigo	1	International Workshop on Deep-Inelastic Scattering (DIS 2010), Florence, Italy, 19-23 April 2010. <i>Charge asymmetry of top quarks</i>	
Francisco V. Flores-Báez	1	QCD10, 15th International QCD conference, Montpellier, France, 28th June - 3rd July 2010. <i>Electromagnetic corrections in hadronic tau decay</i>	
Martín González-Alonso	1	QCD10, 15th International QCD conference, Montpellier, France, 28th June - 3rd July 2010. <i>Duality violation in QCD Sum Rules with the LR correlator</i>	
Martin Jung	1	SuperB Physics Workshop, Frascati, Italy, 1-4 December 2009. <i>Theory predictions for the CP Asymmetry in the Golden Modes</i> CKM2010, 6th International Workshop on the CKM Unitary Triangle, Warwick, United Kingdom, 6-10 September 2010. <i>Flavour physics in two-Higgs-doublet models</i> Charged10, Third International Workshop on Prospects for Charged Higgs Discovery at Colliders, Uppsala, Sweden, 27-30 September 2010. <i>Charged Higgs phenomenology in the aligned two-Higgs-doublet model</i>	
Emilie Passemar	1	Colloquium in memory of J. Stern, Paris, France, October 2-3, 2009. PrimeNet Workshop on eta-eta' physics, Bonn, Germany, October 8 - 9, 2009. NA62 Physics Handbook Workshop, CERN, Geneva, Switzerland, December 10 - 12, 2009. <i>Dispersive approach to $K_{\ell 3}$ form factors</i> 35 th International Conference on High Energy Physics, Paris, France, July 22 - 28, 2010. Quark Confinement and the Hadron Spectrum IX, Madrid, Spain, August 30 - September 3, 2010. <i>Constraints on the $K\pi$ form factors from $\tau \rightarrow K\pi\nu_\tau$ and $K_{\ell 3}$ decays</i> The 11 th International Workshop on Tau Lepton Physics, Manchester, UK, September 13 - 17, 2010. <i>Constraints on the $K\pi$ form factors from $\tau \rightarrow K\pi\nu_\tau$ and $K_{\ell 3}$ decays</i>	ER ER ER ER ER

Antonio Pich	1	<p>Colloquium in Memory of Jan Stern, Institut Henri Poincaré, Paris, France, 2-3 October 2009. <i>QCD tests from tau decay data</i></p> <p>First Meeting of the Spanish LHC Network, Granada, Spain, 28-30 October 2009. <i>Standard Model Tests: Room for New Physics?</i></p> <p>XXXVIII International Meeting on Fundamental Physics, La Palma, Spain, 1-5 February 2010. <i>Flavour Physics</i></p> <p>Planck 2010, CERN, 31 May 4 June 2010. <i>Flavour constraints on the aligned two-Higgs-doublet model</i></p> <p>Third Workshop on Theory, Phenomenology and Experiments in Heavy Flavour Physics, Capri, Italy, 5-7 July 2010. <i>Flavour constraints on the aligned two-Higgs-doublet model</i></p> <p>The 11th International Workshop on Tau Lepton Physics (Tau 2010), Manchester, UK, 13-17 September 2010. <i>Hadronic tau decays</i></p>
Jorge Portolés	1	<p>Chiral10 International Workshop on Chiral Symmetry in Hadrons and Nuclei, Valencia, Spain, 21-24 June 2010. <i>Basics of Resonance Chiral Theory</i></p>
Germán Rodrigo	1	<p>3rd International Workshop on Top Quark Physics (TOP 2010), Brugge, Belgium, 31 May - 4 June 2010. <i>Charge asymmetry in top-antitop quark event: a theory appraisal</i></p> <p>International Linear Collider Workshop (LCWS10 and ILC10) Beijing, China, 26-30 March 2010. <i>Heavy Resonances in the top quark sector: from hadron colliders to the ILC</i></p> <p>Red Temática de Física de LHC, Granada, Spain, 28-30 October 2009. <i>Loops and legs and viceversa</i></p>
Germán Rodrigo, Isabella Bierenbaum, Stefano Catani, Petros Draggiotis	1	<p>Light Cone Dynamics 2010, Valencia, Spain, 14-18 June 2010 <i>Feynman's tree theorem and loop-tree dualities</i></p>
Ignasi Rosell	1	<p>QCD10, 15th International QCD conference, Montpellier, France, 28th June - 3rd July 2010. <i>Revisiting the vector form factor at next-to-leading order in $1/N_C$</i></p>
Paula Tuzón	1	<p>QCD10, 15th International QCD conference, Montpellier, France, 28th June - 3rd July 2010. <i>Constraints on the Aligned two-Higgs-doublet model and CP violation</i></p> <p>PASCOS 2010, 16th International Symposium on Particles, Strings and Cosmology, Valencia, Spain, 19-23 July 2010. <i>Flavour constraints on the Aligned two-Higgs-doublet model and CP violation</i></p>

J.J. Sanz-Cillero	2	<p>SUSY 2010, 18th International Conference on Supersymmetry and Unification of Fundamental Interactions, Bonn, Germany, 19-28 August 2010. <i>Flavour constraints on the Aligned two-Higgs-doublet model and CP violation</i></p> <p>Approximation and extrapolation of convergent and divergent sequences and series, Marseille, France. October 2, 2009 <i>Padé theory and phenomenology of resonance poles</i></p> <p>Int. Mini-workshop Journey in Hadron Physics, Montpellier, France. December 4, 2009 <i>Scalar meson contributions in $\eta' \rightarrow \eta\pi\pi$ decays.</i></p> <p>QCD at work 2010-Int. Workshop on QCD- Theory and Experiment, Martina Franca, Italy. June 22, 2010 <i>One-loop predictions for the pion VFF in resonance chiral theory</i></p> <p>QCD 10 (25th anniversary) 15th Int. QCD Conference, Montpellier, France. July 2, 2010. <i>Scalar and Pseudoscalar correlators in RChT.</i></p> <p>Quark Confinement and the Hadron Spectrum IX, Madrid, Spain. August 31, 2010. <i>Relevance of final state interactions in $\eta' \rightarrow \eta\pi\pi$ decays.</i></p>
A. Parreño	2	<p>Quark Confinement and the Hadron Spectrum IX, Madrid, Spain. August 31, 2010. <i>Lattice QCD calculations of two baryon interactions</i></p>
A. Ramos	2	<p>Int. Nuclear Physics Conference, INPC2010, Vancouver, Canada. July 4 - 9, 2010. <i>Convenor of Parallel Session "Hadrons in Nuclei"</i></p>
J. Rodriguez-Quintero	2	<p>ICHEP 2010; July 22-28, Paris. α_s from Lattice QCD.</p>
F. Mescia	2	<p>Recontres de Moriond 2010, La Thuille, Italy. May 6, 2010. <i>Lattice QCD and New Physics</i></p> <p>RQCD at work 2010-Int. Workshop on QCD- Theory and Experiment, Martina Franca, Italy. June 22, 2010. <i>Lattice QCD and Light Quark sector</i></p> <p>CKM 2010, Warwick, U.K. Sept. 6, 2010. <i>Convenor</i></p> <p>Workshop NA62 Physics Handbook, CERN, Switzerland. December 10, 2009. <i>Convenor</i></p>
C. Downum	2	<p>Quarkonium Working Group, Fermilab, Chicago USA. May 18, 2010. <i>S-wave pi exchange and its implications for quarkonium spectroscopy</i></p> <p>Int. Workshop on Chiral Symmetry in Hadrons and Nuclei, Valencia, Spain. June 21, 2010. <i>S-wave pi exchange and its implications for quarkonium spectroscopy</i></p>

		Quark Confinement and the Hadron Spectrum IX, Madrid, Spain. August 31, 2010. <i>Towards using lattice data to calculate open-flavor effects in heavy quarkonium phenomenology</i>
M. Jamin	2	Tau 2010, Manchester, U.K., Sept. 13, 2010. <i>Towards using lattice data to calculate open-flavor effects in heavy quarkonium phenomenology</i>
A. Pineda	2	Int. Workshop on Heavy Quarkonium, Fermilab, USA. May 18, 2010. <i>Perturbative calculations of inclusive quarkonia decay rates</i> Int. Workshop on QCD: Theory and Experiment, Martina Franca, Italy. June 20, 2010. <i>Heavy Quarkonium hyperfine and inclusive electromagnetic decays from QCD</i>
Z. Guo	2	Quark confinement and the hadron spectrum IX, Madrid, Spain. August 30, 2010. <i>QCD predictions for heavy quarkonium at weak coupling</i>
		QCD 10 (25th anniversary) 15th Int. QCD Conference, Montpellier, France. July 2, 2010. <i>Meson-meson scatterings from U(3) chiral perturbation theory</i> Workshop of the FlaviaNet European Network, Munich, Germany. Sep. 10, 2010. <i>Phenomenology study within U(3) chiral perturbation theory</i>
D. Boito	2	QCD 10 (25th anniversary) 15th Int. QCD Conference, Montpellier, France. July 2, 2010. <i>Constraining the K_{π} vector form factor by $\tau \rightarrow K\pi\nu_{\tau}$ and K_{l3} decay data</i> NA62 Physics Handbook Workshop, CERN, Switzerland. December 2009. <i>A representation of the K_{π} vector form factor valid for $Ke3$ and $\tau \rightarrow K\pi\nu$ decays</i> Workshop of the FlaviaNet European Network, Munich, Germany. Sep. 10, 2010. <i>K_{π} vector form factor constrained by tau and K_{l3} decays</i> 11th Int. Workshop on Tau Lepton Physics, Manchester, U.K. September 13, 2010. <i>QCD parameters from tau hadronic spectral moment fits including duality violations</i> 11th Int. Workshop on Tau Lepton Physics, Manchester, U.K. September 13, 2010. <i>QCD parameters from tau hadronic spectral moment fits including duality violations</i>

D. Greynat	2	<p>Quark confinement and the hadron spectrum IX, Madrid, Spain. August 30, 2010. <i>Resummation of Threshold, Low- and High-Energy Expansions for Heavy-Quark Correlators</i></p> <p>Workshop of the FlaviaNet European Network, Munich, Germany. Sep. 10, 2010. <i>Resummation of Threshold, Low- and High-Energy Expansions for Heavy-Quark Correlators</i></p>
M. Stahlhofen	2	<p>Workshop of the FlaviaNet European Network, Munich, Germany. Sep. 10, 2010. <i>The QCD Static Potential in 2+1 Dimensions</i></p> <p>Quark confinement and the hadron spectrum IX, Madrid, Spain. August 30, 2010. <i>The QCD Static Potential in 2+1 Dimensions</i></p> <p>QCD 10 (25th anniversary) 15th Int. QCD Conference, Montpellier, France. July 2, 2010. <i>The QCD Static Potential in 2+1 Dimensions</i></p>
R. Escribano	2	<p>Hadron 2009: 13th Int. Conference on Hadron Spectroscopy, Tallahassee, USA. Nov. 26, 2009. <i>K pi form factors, final state interactions and $D^+ \rightarrow K^- \pi^+ \pi^+$ decays.</i></p> <p>Hadron 2009: 13th Int. Conference on Hadron Spectroscopy, Tallahassee, USA. Nov. 26, 2009. <i>A preliminary analysis of $\eta' \rightarrow \eta \pi \pi$ in chiral theories.</i></p> <p>Quark confinement and the hadron spectrum IX, Madrid, Spain. August 30, 2010. <i>K pi vector form factor constrained by $\tau^- \rightarrow K \pi \nu_\tau$ and K_{l3} decays.</i></p> <p>CKM2010: 16th Int. Workshop on the CKM Unitarity Triangle, Warwick, UK. Sep. 6, 2010. <i>K pi vector form factor constrained by $\tau^- \rightarrow K \pi \nu_\tau$ and K_{l3} decays.</i></p>
J. Soto	2	<p>QCD at work 2010, Martina-Franca, Italy. June 20, 2010. <i>Chiral effective theory with a light scalar</i></p>
S. Peris	2	<p>Approximation and extrapolation of convergent and divergent sequences and series, Marseille, France. October 2, 2009 <i>Large-N_c Quantum Chromodynamics and rational approximants</i></p>
Elaine Goode	3	<p>Lattice meets Phenomenology Workshop, Durham, UK, September 2010. <i>K to pi pi Decays on the Lattice</i></p>
Michael Pennington	3	<p>Hadron 2009: 13th International Conference On Hadron Spectroscopy, Tallahassee, Florida Nov-Dec 2009. <i>Light O^{++} Mesons: Scalargators in Florida</i></p>
Thomas Rae	3	<p>XXVIII International Symposium on Lattice Field Theory, Sardinia, Italy, June 2010. <i>Parton Distribution Amplitudes</i></p>

Chris Sachrajda	3	<p>NA62 Physics Workshop, CERN, Geneva, Switzerland, December 2009. <i>On Kaon Physics (Non-Leptonic Decays)</i></p> <p>Conference on Indirect Searches for New Physics at the time of LHC, Galileo Galilei Institute for Theoretical Physics, Florence, Italy, March 2010. <i>Lattice QCD and Flavour</i></p> <p>XXVIII International Symposium on Lattice Field Theory, Sardinia, Italy, June 2010. <i>Phenomenology from the Lattice</i></p> <p>CERN Theory Institute, Geneva, Switzerland, August 2010. <i>$K \rightarrow (\pi\pi)_{I=2}$ Decay Amplitudes</i></p> <p>Euroflavour 2010, Munich, Germany, September 2010. <i>Status and Prospects for Lattice Calculations of Non-leptonic Kaon Decays</i></p> <p>Lattice meets Phenomenology Workshop, Durham, UK, September 2010. <i>Kaon Physics from Lattice QCD</i></p> <p>Workshop on Flavour Physics: Strong Dynamics, Rare Decays and New Phenomena, Munich, Germany, October 2010. <i>Lattice Andrzejdynamics</i></p>
Jürgen Rohrwild	4	<p>6th International Workshop On The CKM Unitarity Triangle: CKM 2010, Warwick, UK. 6-10 Sep 2010. <i>On the Status of V_{td}, V_{ts} and V_{tb}</i></p> <p>Annual Meeting of the German Physical Society, Bonn, Germany. 15-19 Mar 2010. <i>Extra Fermion Generations and Flavour Bounds</i></p>
Markus Bobrowski	4	<p>35th International Conference on High Energy Physics (ICHEP) 2010, Paris, France. 22-28 Jul 2010. <i>Charm mixing in the Standard Model</i></p>
Andreas Crivellin	4	<p>IX SuperB Workshop, Frascati, Italy, 01-04 Dec. 2009. <i>Effects of right-handed currents on the determinations of V_{ub} and V_{cb}</i></p> <p>Interplay of Collider and Flavour Physics, CERN, Switzerland. 14-16 Dec 2009. <i>Right-handed W-coupling and single top production</i></p> <p>Supersymmetry 2010 (SUSY-10), Bonn, Germany. 23-28 Aug 2010. <i>Radiative flavour violation</i></p>
Jennifer Girrbach	4	<p>Supersymmetry 2010 (SUSY-10), Bonn, Germany. 23-28 Aug 2010. <i>Lepton Flavour Observables in the MSSM</i></p>
Michal Kreps	4	<p>Physics at LHC 2010, Hamburg, Germany. 7-12 June 2010. <i>B physics (Experiment)</i></p> <p>6th International Workshop on the CKM Unitarity Triangle, Coventry, 6-10 September 2010. <i>Measurement of B_s mixing phase at CDF</i></p>

Ulrich Nierste	4	<p>6th International Workshop on the CKM Unitarity Triangle, Coventry, 6-10 September 2010. <i>Summary of WG4: "Lifetime, mixing and weak mixing phase in charm and beauty, including direct determination of V_{tx}"</i></p> <p>Physics in Collision, Karlsruhe, Germany. 1-4 Sep 2010. <i>B_s Physics</i></p> <p>Flavor Physics and CP Violation, Torino, Italy. 25-29 May 2010. <i>Status of SuperKEKB and Belle II</i></p> <p>XVIII International Workshop on Deep-Inelastic Scattering and Related Subjects, Florence, Italy. 19-23 Apr 2010 <i>Υ Polarization Measurements at CDF</i></p> <p>Conference In Honor Of Murray Gell-Mann's 80th Birthday: Quantum Mechanics, Elementary Particles, Quantum Cosmology & Complexity, Singapore. 24-26 Feb 2010. <i>Lepton flavour violation</i></p> <p>Les Rencontres de Physique de la Vallée d'Aoste, La Thuile, Aosta Valley, Italy. 28 Feb - 6 Mar 2010. <i>Flavour physics within and beyond the Standard Model</i></p> <p>Supersymmetry 2010 (SUSY-10), Bonn, Germany. 23-28 Aug 2010. <i>Supersymmetric Flavour physics</i></p> <p>6th International Workshop On The CKM Unitarity Triangle: CKM 2010, Warwick, UK. 6-10 Sep 2010. <i>Lifetimes and mixing parameters of neutral b hadrons</i></p>
Markus Rührken	4	<p>Physics in Collision, Karlsruhe, Germany. 1-4 September 2010. <i>Measurement of the branching fraction of $B^0 \rightarrow D^\pm D^\pm$ decays</i></p>
Dominik Scherer	4	<p>Interplay of Collider and Flavour Physics, CERN, Switzerland. 14-16 Dec 2009. <i>MSSM at large $\tan \beta$ beyond the decoupling limit</i></p> <p>Annual Meeting of the German Physical Society, Bonn, Germany. 15-19 Mar 2010. <i>Electroweak penguins in isospin-violating B_s decays</i></p>
Matthias Steinhauser	4	<p>International Conference on High Energy Physics (ICHEP) 2010, Paris, France, 22-28 Jul 2010. <i>Electroweak penguins in isospin-violating B_s decays</i></p> <p>35th ICHEP conference, Paris, France. July 22-28, 2010 <i>Three loop heavy quark potential</i></p> <p>Loops and Legs in Quantum Field Theory 2020, Wörlitz, Germany <i>The 3-Loop Static QCD Potential</i></p>
Felix Wick	4	<p>ICHEP 2010, Paris, France. 22-28 Jul 2010 <i>Charm baryon spectroscopy at CDF</i></p>
Daniel Zander	4	<p>Physics in Collision, Karlsruhe, Germany. 1-4 Sep 2010. <i>An improved full reconstruction tool utilizing NeuroBayes</i></p>

Anze Zupanc	4	Flavor Physics and CP Violation, Torino, Italy. 25-29 May 2010. <i>$D_{(s)}^+$ decays and their CPV</i>
Thomas Mannel	4	Physics in Collision, Karlsruhe, Germany. 1-4 Sep 2010. <i>D mixing and decay</i>
	4	Progress and Challenges in Flavour Physics, Primosten, Croatia, 29 Sep - 4 Oct 2009. <i>The Theory Status of Semileptonic $B \rightarrow X_c \ell \nu$ Decays</i>
	4	Vxb 2009 Workshop, SLAC, Stanford, USA, 30-31 Oct 2009. <i>Semileptonic $B \rightarrow X_c \ell \nu$ Decays: Overview</i>
	4	Int. Conf. on Flavor Physics and CP Violation 2010, 25-29 May 2010, Torino, Italy. <i>V_{cb} and V_{ub} Determination: A Theory Perspective</i>
	4	BaBar Collaboration Meeting, Humboldt-Univ., 4-7 Oct 2010, Berlin, Germany. <i>Topics in $b \rightarrow q \ell \nu$ and $b \rightarrow q \ell \ell$</i>
Sascha Turczyk	4	Progress and Challenges in Flavour Physics, Primosten, Croatia, 29 Sep - 4 Oct 2009. <i>Recent Developments in the Precision Calculation of V_{cb}</i>
	4	Vxb 2009 Workshop, SLAC, Stanford, USA, 30-31 Oct 2009. <i>Calculations at $(1/m_b)^{n>3}$ and $(1/(mb^3 m c^m))$ Order</i>
Alexander Khodjamirian	4	Progress and Challenges in Flavour Physics, Primosten, Croatia, 29 Sep - 4 Oct 2009. <i>Hadronic form factors for flavour physics</i>
	4	Vxb 2009 Workshop, SLAC, Stanford, USA, 30-31 Oct 2009. <i>Non-lattice QCD calculations for semileptonic B and D decays</i>
	4	Workshop QCD@Work, June 2010, Martina Franca, Italy, . <i>Hadronic Matrix Elements with Heavy Quarks: The Charm-Loop Effect in $B \rightarrow K^* \ell^+ \ell^-$</i>
	4	Workshop CKM-2010, Warwick, UK, 7-10 Sep 2010, <i>Form factors and long-distance effects in $B \rightarrow V(P) \ell^+ \ell^-$ and $B \rightarrow V \gamma$</i>
Wolfgang mannshofer	Alt- 4	CERN Workshop on interplay of collider and flavour physics, 3rd general meeting, Geneva, Switzerland, 14 Dec - 16 Dec 2009, <i>Patterns of Flavor and CP Violation in Supersymmetric Theories.</i> SUSY10, 18th International Conference on Supersymmetry and Unification of Fundamental Interactions, Bonn, Germany, 23 Aug - 28 Aug 2010, <i>CP Violation in Meson Mixing: Implications for SUSY Models</i>
Nora Brambilla	4	“Quark Confinement and the Hadron Spectrum”, Madrid, Spain, 30 Aug-3 Sep 2010, <i>Quarkonium at finite temperature.</i>

Andrzej J. Buras	4	Physics at LHC 2010, DESY, Germany, 6-12 Jun 2010, <i>Flavour Theory and the LHC Era</i> .
Thorsten Feldmann	4	6th Vienna Central European Seminar on Particle Physics and Quantum Field Theory, Vienna, Austria, 27-29 Nov, 2009, <i>Soft-Collinear Effective Theory and B-Meson Decays</i> . B-Physics Workshop, Neckarzimmern, Germany, 17-19 Feb 2010, <i>Heavy-Quark Expansion for exclusive B Decays</i> .
Katrin Gemmler	4	CKM Workshop 2010, Warwick, England, 6-10 Sep 2010, <i>Quark flavour mixing with right-handed currents: an effective approach</i> .
Stefania Gori	4	SUSY 2010: 18th International Conference on Supersymmetry and the Unification of Fundamental Interactions, Bonn, Germany, 23-28 Aug 2010, <i>Flavor changing neutral currents in two Higgs doublet models</i> .
Tillmann Heidsieck		Indirect Searches for New Physics at the time of LHC, Florence, Italy, 22 Feb - 2 Mar 2010, <i>Flavour Violation with a Fourth Generation</i> DPG Frühjahrstagung 2010, Bonn, Deutschland, 14-18 Mar 2010, <i>Flavour Violation in the SM4 (Part 2)</i> 22nd Rencontres de Blois, Blois, France, 15-20 Jul 2010, <i>Highlights of Flavour Violation in the Presence of a 4th Generation</i> 6th International Workshop on the CKM Unitarity Triangle (CKM2010), Warwick, England, 6-11 Sep 2010, <i>Flavour physics with a 4th generation</i>
Massimiliano Procura	4	Joint Workshop on V_{ub} and V_{cb} (Vxb 2009), Menlo Park, CA, USA, 29-31 Oct 2009, <i>Inclusive vs. Exclusive: A Novel Method for Measuring V_{ub}</i> . SCET Workshop 2010, Ringberg Castle, Munich, Germany, 6-9 Apr 2010, <i>Quark Fragmentation within an Identified Jet</i> . Quark Confinement and the Hadron Spectrum IX, Madrid, Spain, 30 Aug - 3 Sep 2010, <i>Quark Fragmentation within an Identified Jet</i> . Electromagnetic Probes of Strongly Interacting Matter, ECT, Trento, Italy, 13-17 Sep, 2010 <i>In medium rho meson and QCD sum rules</i> .
Christoph Promberger	4	DPG-Frühjahrstagung, Bonn, Germany, 15-19 Mar 2010, <i>Flavour Physics in the Presence of a Fourth Generation of Quarks and Leptons - Part I</i> .
Stefan Recksiegel	4	Corfu Workshop on the Standard Model and Beyond, Corfu, Greece, 29 Aug - 5 Sep 2010, <i>Flavour Physics Effects of a 4th Generation</i> .

David Straub	4	<p>CKM2010, Warwick, UK, 610 Sep 2010, <i>New Physics Correlations in Rare Decays</i></p> <p>SUSY 10, Bonn, Germany , 2328 Aug, 2010</p> <p>Waiting for the LHC: Electroweak and Flavour Dynamic, Munich, Germany, 35 May 2010</p> <p>Interplay of Collider and Flavour Physics, CERN, Switzerland , Dec. 1416 Dec 2009.</p> <p>SuperB Physics Workshop, Frascati, Italy , 30 Nov 4 Dec 2009, <i>Testing SUSY Flavour Models at SuperB</i></p> <p>Science Week of the Cluster of Excellence “Origin and Structure of the Universe”, Garching, Germany, 1215 Oct 2009 <i>Traces of supersymmetry in flavour physics and electric dipole moments</i></p>
Antonio Vairo	4	<p>Relativistic description of two- and three-body systems in nuclear physics, ECT, Italy, 19-23 Oct 2009, <i>Non-relativistic bound states: the long way back from the Bethe–Salpeter to the Schrödinger equation.</i></p> <p>6th Vienna Central European Seminar on Effective Field Theories, Vienna, Austria, 27-29 Nov 2009, <i>Effective field theories for non-relativistic bound states.</i></p> <p>International Workshop on Heavy Quarkonium, Fermilab, USA, 18-21 May 2010, <i>Static $Q\bar{Q}$ correlators and $pNRQCD$ at $T > 0$.</i></p> <p>Antiproton Physics Workshop, Fermilab, USA, 22 May 2010, <i>Quarkonia: A Theoretical Framework.</i></p> <p>Quarkonium and deconfined matter in the LHC era, Martina Franca, Italy, 16-18 Jun 2010, <i>Heavy quarkonium in a weakly coupled quark-gluon plasma.</i></p> <p>QCD@work, Martina Franca, Italy, 20-23 June 2010, <i>Heavy quarkonium in a weakly coupled quark-gluon plasma.</i></p> <p>Quark confinement and the hadron spectrum IX , Madrid, Spain, 30 Aug - 3 Sep 2010, <i>The three-quark and two-quark static potentials at NNLO.</i></p>
Achim Denig	4	<p>Gordon Conference on Photonuclear Reactions, Tilton School, Tilton, NH, USA. August 1-6, 2010. <i>New measurements of meson transition form factors at BaBar</i></p> <p>Primenet Workshop, Lisbon, Portugal. September 16-18, 2010. <i>New measurements of meson transition form factors at BaBar</i></p>
Stefan E. Mueller	4	<p>International Workshop on e+e- collisions from φ to ψ, Beijing, China. October 14, 2009. <i>Measurement of the pion form factor between 0.1 and 0.85GeV² with the KLOE detector</i></p>

		DPG, Bonn, Germany. March 15-19, 2010. <i>Measurement of the pion form factor between 0.1 and 0.85GeV² with the KLOE experiment using the radiative return</i>	
Paolo Beltrame	4	DESY, Zeuthen, Germany. July 26, 2010. <i>Pion form factor measurement and its contribution to $(g - 2)_\mu$ with the KLOE detector</i>	
Wolfgang Gradl	4	15th International QCD Conference, Montpellier, France. 2 July 2010. <i>Hadronic B decays at BABAR</i> DPG Frhjahrstagung 2010, Bonn, Germany. 17 March 2010. <i>Charmless B Decays with BABAR</i> 1st workshop of the "Les Nabis" colloaboration, Kloster Eberbach, Germany. 1 March 2010. <i>Charm Dalitz Analyses and CP</i>	
Miriam Fritsch	4	Frühjahrstagung 2010 des Fachverbandes Hadronen und Kerne der Deutschen Physikalischen Gesellschaft, Bonn, Germany. March 2010. <i>Hadronspektroskopie von BaBar zu PANDA</i> Hadron 09, Tallahassee, FL, USA. November 30 - December 04. <i>Recent results on low energy e+e- annihilations produced via ISR at BaBar</i>	
David Palao	5	Lattice 2010, Villasimius (Italy), June 2010, <i>Renormalization constants for Wilson Fermions with four dynamical flavours</i>	ESR
Gino Isidori	5	ICHEP 2010, Paris (France), July 2010, <i>The Challenges of Flavour Physics</i> Planck 2010, CERN (Switzerland), June 2010, <i>Higgs-mediated flavour-changing neutral currents</i> Interplay of Collider and Flavour Physics, CERN (Switzerland), Dec 2010, <i>MFV vs. NMFV</i>	
Barbara Sciascia	5	CKM 2010, Warwick (UK), Sept 2010, <i>Testing V_{us} and V_{ud}: CKM unitarity</i>	
Antonio Davide Polosa	5	Flavor Physics and CP Violation 2010, Torino (Italy), May 2010, <i>New quarkonia states</i>	
Riccardo Faccini	5	Third Workshop on Theory, Phenomenology and Experiments in Heavy Flavour Physics, Capri (Italy), July 2010, <i>Exotic heavy quarkonium: towards a new spectroscopy</i>	
Marco Ciuchini	5	Third Workshop on Theory, Phenomenology and Experiments in Heavy Flavour Physics, Capri (Italy), July 2010, <i>UTfit update</i>	

Henryk Czyż	6	The 11th International Workshop on Tau Lepton Physics, Manchester, UK, 13-17 September 2010. <i>PHOKHARA 7.0 Monte Carlo generator: the narrow resonances implementation and new pion and kaon form factors</i>	
Mikołaj Misiak	6	Loops and Legs in Quantum Field Theory, Wörlitz (Germany), 25-30 April 2010. <i>Perturbative calculations of radiative B decay</i> Flavor Physics and CP Violation 2010 May 25-29, 2010 Torino - Italy <i>Radiative and rare semileptonic decays</i> QCD@Work - International Workshop on QCD - Theory and Experiment, Martina Franca (Italy), 20-23 June 2010. <i>QCD challenges in radiative B decays</i>	
Janusz Gluza	6	Loops and Legs in Quantum Field Theory, Wörlitz (Germany), 25-30 April 2010. <i>News on Ambre and CSectors</i>	
Zbigniew Wąs	6	The 11th International Workshop on Tau Lepton Physics, Manchester, UK, 13-17 September 2010. <i>TAUOLA for simulation of tau decay and production: perspectives of precision low energy and LHC applications</i>	
Johan Bijnens	7	PrimeNet meeting, Bonn, Germany, 6-9/10/2009. $\eta \rightarrow \pi\pi\pi$ at two-loop order in ChPT NA62 Physics Handbook Workshop, CERN, Geneva, Switzerland, 10-12/12/2009. <i>Hadronic Decays</i> XXXIII Panda collaboration meeting, Stockholm, Sweden, 16/6/2010. <i>Some (Theory) Challenges for PANDA</i>	
Ilaria Jemos	7	Particle days 2009, 1-2 October 2009, Lund, Sweden. <i>Determination of Low Energy Constants and testing Chiral Perturbation Theory at Next to Next to Leading Order</i>	ESR
		6th Vienna Central European Seminar on Particle Physics and Quantum Field Theory 27-29/11/2009, Vienna, Austria. QCD 10, Montpellier, 28/6-3/7/2010. <i>Neutral pseudoscalar meson decays</i> PrimeNet Meeting, Lisbon, 16-18/9/2010. $\pi^0, \eta \rightarrow \gamma\gamma$ and $\eta \rightarrow 3\pi$ at two loops	ESR
Lisa Carloni	7	Particle days 2009, 1-2 October 2009, Lund, Sweden. <i>Hidden valleys</i>	

		6th Vienna Central European Seminar on Particle Physics and Quantum Field Theory 27-29/11/2009, Vienna, Austria. <i>Leading Logarithmic Corrections Resummed</i>
Jie Lu	7	MC4BSM 2010, April 14-16/4/2010, Copenhagen, Denmark. <i>MC Tools for Hidden Valley Scenarios</i> Particle days 2009, 1-2 October 2009, Lund, Sweden. <i>QCD like Theories at next to next to leading order</i> 6th Vienna Central European Seminar on Particle Physics and Quantum Field Theory 27-29/11/2009, Vienna, Austria. <i>QCD like Theories at next to next to leading order</i> Origin of Mass 2010, May 3-7, 2010 Odense, Denmark. <i>QCD like Theories at next to next to leading order</i>
D. Becirevic	8	QCD@Work 2010. Martina Franca, Italy. June 2010 <i>Lessons on the dynamics of heavy-light mesons from the static limit of QCD</i>
B. Blossier	8	Vxb 2009. Stanford, USA. October 2009 <i>New lattice methods</i> Lattice 2010. Villasimius, Italy. June 2010 <i>B meson spectrum and decay constant from $N_f = 2$ simulations</i>
D. Derkach	8	Flavor Physics and CP Violation 2010. Torino, Italy. May 2010. <i>Measurements of γ</i>
S. Descotes-Genon	8	Flavor Physics and CP Violation 2010. Torino, Italy. May 2010. <i>Global fit to CKM data (CKMfitter)</i> Lattice 2010. Villasimius, Italy. June 2010 <i>Let's go dynamic - a quick tour through 2+1 lattice simulations to understand chiral symmetry breaking</i> Workshop on Lattice meets phenomenology. Durham, UK, September 2010 <i>CKM Fits</i>
J. Frison	8	Lattice10. Villasimius, Italy. May 2010 <i>Rho decay widths from the lattice</i>
M. Gravina	8	Lattice 2010. Villasimius, Italy. June 2010 <i>Ghost-gluon coupling power corrections and $\Lambda_{\overline{MS}}$ from twisted-mass lattice QCD at $N_f = 2$</i>
L. Lellouch	8	Workshop in the honour of Chris Sachrajda. Southampton, UK. December 2009. <i>Non-Perturbative QCD from First Principles</i>
F. Machefert	8	Flavor Physics and CP Violation 2010. Torino, Italy. May 2010. <i>Upgrade of LHCb</i>
B. Malaescu	8	Tau 10. Manchester, UK, September 2010 <i>Measurement of e^+e^- to hadron cross-section at low energy with ISR events at BaBar</i>

B. Moussallam	8	Mini-workshop on scalars. Montpellier, France. December 2009 <i>πK in the complex plane and the $K_0^*(800)$</i> Quark confinement and the hadron spectrum. Madrid, Spain. September 2010 <i>MO analysis of new Belle $\gamma\gamma \rightarrow \pi\pi$ results with chiral constraints</i>	
T.N. Pham	8	QCD@Work. Martina Franca, Italy. June 2010 <i>Two-photon and Two-gluon Decays of 0^{++} and 2^{++} P-wave Heavy Quarkonium States</i>	
A. Portelli	8	Lattice10. Villasimus, Italy. May 2010 <i>Electromagnetic corrections to light hadron masses</i>	
E. de Rafael	8	QCD10. Montpellier, France. June 2010 <i>Large-N_c QCD and harmonic sums</i>	
A. Ramos	8	Workshop in the honour of Chris Sachrajda. Southampton, UK. December 2009. <i>The ratio F_K/F_π in full QCD</i>	ER
		Lattice10. Villasimus, Italy. May 2010 <i>Sigma term and strange content of the nucleon</i>	ER
		QCD10. Montpellier, France. June 2010 <i>State-of-art lattice results of QCD with light flavours</i>	ER
		ICHEP10. Paris, France. July 2010 <i>Some phenomenology from the lattice: decay constants and sigma terms</i>	ER
		CKM10. Warwick, UK. September 2010 <i>F_K/F_π from the BMW collaboration</i>	ER
P. Roig-Garcès	8	QCD10. Montpellier, France. June 2010 <i>$\tau \rightarrow \eta\pi\pi\eta$ and $e^+e^- \rightarrow \eta\pi\pi$ at low energies</i>	ESR
		Quark confinement and the hadron spectrum. Madrid, Spain. September 2010 <i>J/ψ Radiative transitions to η_c</i>	ESR
		Tau 10. Manchester, UK, September 2010 <i>Hadronization effects in $\tau \rightarrow \pi\gamma\nu$ decays</i>	ESR
H. Sazdjian	8	QCD@Work 2010. Martina Franca, Italy. June 2010 <i>The gauge invariant quark Green's function in two-dimensional QCD</i>	
H. Sazdjian	8	QCD10. Montpellier, France. July 2010 <i>The gauge invariant quark Green's function in two-dimensional QCD</i>	
A. Stocchi	8	CKM10. Warwick, UK. September 2010 <i>CKM fits and model-independent constraints on physics BSM</i>	
A. Tayduganov	8	International Conference on High-Energy Physics. Paris, France. July 2010. <i>Determining the photon polarization using the radiative $B \rightarrow K_1(1270)\gamma$ decay</i>	
Gilberto Colangelo	9	"EUROFLAVOUR 09", Bari, 9-11.11.2009, <i>Status report of the FLAG activities</i>	

Gilberto Colangelo	9	“The New, the Rare and the Beautiful”, Workshop at University of Zurich, Zurich, Switzerland, 7.-9.1.2010, <i>Minimal flavour violations in SUSY GUTs</i>
Gilberto Colangelo	9	“MESON 2010”, Cracow, Poland, 10.-15.6.2010, <i>The $\pi\pi$ scattering amplitude from low to high energy</i>
Gilberto Colangelo	9	Primenet Workshop, Lisbon, Portugal, 16-18.9.2010 <i>Determination of quark masses: the contribution of $\eta \rightarrow 3\pi$</i>
Leonardo Giusti	9	2009 Taipei Workshop on Lattice QCD, December 2009 <i>Chiral symmetry breaking and the Banks–Casher relation on the lattice</i>
Leonardo Giusti	9	Conference on Computational Physics 2009 (CCP09) - Taiwan December 2009. <i>Exploiting symmetries for exponential error reduction in path integral Monte Carlo</i>
Leonardo Giusti	9	CSCS User day - Luzern (CH) September 2010. <i>Numerical lattice gauge theory with a symmetry-constrained Monte Carlo</i>
Christoph Greub	9	“The New, the Rare and the Beautiful”, Workshop at University of Zurich, Zurich, Switzerland, 7.-9.1.2010, <i>From atomic alchemy to inclusive rare B-decays</i>
Christoph Greub	9	“35th International Conference on High Energy Physics (ICHEP)”, Paris, France, July 22-28, 2010, <i>no talk given</i>
Tobias Hurth	9	“SuperB physics workshop”, Frascati, Italy, 30.11.-4.12.2009, <i>Interplay of Flavour and High-p_T Physics</i>
Tobias Hurth	9	“The New, the Rare and the Beautiful”, Workshop at University of Zurich, Zurich, Switzerland, 7.-9.1.2010, <i>The Role of Flavour Physics in the LHC Era</i>
Tobias Hurth	9	“International Conference on High Energy Physics”, Paris, France, 22.-28.7.2010 <i>New physics sensitivity of the rare decay mode $b \rightarrow s\ell^+\ell^-$</i>
Tobias Hurth	9	“Third International Workshop on Charged Higgs Discovery”, Uppsala, Sweden, 27.-30.9.2010 <i>Interpretation of charged Higgs effects in low-energy flavour physics</i>
Martin Lüscher	9	XXVIII International Symposium on Lattice Field Theory, Villasimius, Italy, June 2010. <i>Topology, the Wilson flow and the HMC algorithm</i>
Volker Pilipp	9	“9th International Symposium on Radiative Corrections: Applications of Quantum Field Theory to Phenomenology (RADCOR 2009)”, Ascona, Switzerland, 25-30 October 2009, <i>$b \rightarrow s\ell^+\ell^-$ in the high q^2 region at two-loops</i>

Svjetlana Fajfer	10	<p>Waiting for the LHC: Electroweak and Flavour Dynamics, TU Munich, Germany. May 2010. <i>Signals of light coloured scalars from grand unification in the up quark sector</i></p> <p>Goran Fest: The Joy of Making Physics, Split, Croatia. June 2010. <i>Signals of light coloured scalars from grand unification in the up quark sector</i></p> <p>3rd Workshop on Theory, Phenomenology and Experiments in Heavy Flavour Physics, Capri, Italy. July 2010. <i>Light coloured scalars and the up quarks phenomenology</i></p>	
Jernej Fasel Kamenik	10	<p>PEPS Theory-Experiment Interplay Focus Week: Semileptonic and Radiative B Decays, Orsay, France. December 2009. <i>Aspects of rare B decays in minimal flavour violating theories</i></p> <p>Waiting for the LHC: Electroweak and Flavour Dynamics, TU Munich, Germany. May 2010. <i>Aspects of rare top quark decays</i></p> <p>FPCP 2010, Univ. Torino, Italy. May 2010. <i>Inclusive semileptonic D decays and the heavy quark expansion</i></p> <p>Planck 2010, CERN, Geneva, Switzerland. June 2010. <i>Signals of low scale I and III see-saw models</i></p> <p>Physics at the LHC, DESY, Hamburg, Germany. June 2010. <i>Drell-Yan production of heavy vectors in Higgsless models</i></p> <p>BEACH 2010, Perugia, Italy. June 2010. <i>Lepton energy moments in semileptonic charm decays</i></p> <p>6th Open Meeting of the Belle II Collaboration, KEK, Tsokuba, Japan. July 2010. <i>Precision flavour observables and their implications for the minimal flavour violating paradigm</i></p> <p>CKM 2010, Univ. Warwick, UK. September 2010. <i>Theory of $B \rightarrow \ell\nu$ and $B \rightarrow \tau\nu$ and Theory of $b \rightarrow s/d\nu\nu$</i></p>	
Pere Masjuan	10	<p>PrimeNet Workshop 2009, Bonn, Germany. October 2009. <i>$\eta' \rightarrow \eta\pi\pi$ in different chiral frameworks</i></p> <p>6th Vienna Central European Seminar on Particle Physics and Quantum Field Theory: Effective Field Theories, Vienna, Austria. November 2009. <i>Chiral dynamics predictions for $\eta' \rightarrow \eta\pi\pi$</i></p> <p>QCD at Work: International Workshop on QCD - Theory and Experiment, Martina Franca, Italy. June 2010. <i>Analytic approximants for the extrapolation of lattice data</i></p>	ESR

Sasa Prelovsek	10	<p>QCD 2010, 15th International QCD Conference, Montpellier, France. June/July 2010. <i>Unfolding the second Riemann sheet with Padé approximants: hunting resonance poles</i></p> <p>Quark Confinement and the Hadron Spectrum, Madrid, Spain. August/September 2010. <i>Hunting resonance poles with Padé approximants: a model-independent method</i></p> <p>PrimeNet Workshop 2010, Lisbon, Portugal. September 2010. <i>Final state interactions in $\eta' \rightarrow \eta\pi\pi$</i></p> <p>Excited QCD 2010, Tatra National Park, Slovakia. January/February 2010. <i>Lattice Searches for tetraquarks and mesonic molecules: light scalar mesons and XYZ states</i></p>	
Martin Zdrahal	10	<p>Colloquium in memory of Jan Stern, Paris, France. October 2009.</p> <p>Meeting in honour of Chris Sachrajda, Southampton, United Kingdom. December 2009. <i>Dispersive construction of the two-loop $\eta \rightarrow 3\pi$ amplitude</i></p>	ESR
Jure Zupan	10	<p>FPCP 2010, Torino, Italy. May 2010. <i>Angle measurements and new physics</i></p> <p>Planck 2010, CERN, Geneva, Switzerland. June 2010. <i>Higgs decaying into lepton jets</i></p> <p>PACT, SISSA, Trieste, Italy. June 2010. <i>Higgs decaying into lepton jets</i></p> <p>From Colliders to the Dark Sector, Aspen, Colorado, USA. July 2010. <i>Like-sign dimuon anomaly and MFV</i></p> <p>IDM 2010, Montpellier, France. July 2010. <i>Higgs decays to dark sector</i></p> <p>CKM 2010, Univ. Warwick, UK. September 2010. <i>The case for measuring γ precisely and Working group VI summary</i></p>	
Akaki Rusetsky	11	<p>invited lecture, 6th Vienna Central European Seminar, Vienna, Austria (November 2009), <i>Hadronic atoms</i></p> <p>Invited talk at the Workshop Hadrons, Lattice QCD and Chiral Perturbation Theory, Graz, Austria (September 2010), <i>Resonance matrix elements</i></p> <p>Working group leader, Hadron Physics Summer School, Bad Honnef, Germany (August 2010), <i>$\eta \rightarrow 3\pi$ decays</i></p> <p>Seminar at Tbilisi State University, Tbilisi, Georgia (October 2009), <i>Scattering and resonances in lattice field theory</i></p> <p>Seminar at IPN Orsay, Orsay, France (February 2010), <i>Resonances on the lattice</i></p>	

Bastian Kubis	11	<p>Seminar at IKPH, University of Mainz, Mainz, Germany (May 2010), <i>Resonances in a finite volume</i></p> <p>Seminar at the University of Bochum, Bochum, Germany (June 2010), <i>Resonances in a finite volume</i></p> <p>Seminar at the IFAE, Universitat Autònoma de Barcelona, Spain (June 2010), <i>Rescattering effects in $\eta \rightarrow 3\pi$ decays</i></p> <p>Seminar at the Ruhr-Universität, Bochum, Germany (July 2010), <i>Rescattering effects in $\eta \rightarrow 3\pi$ decays</i></p> <p>Invited talk at the Gordon Conference on Photonuclear Reactions, Tilton/NH, USA (August 2010) <i>Meson Chiral Perturbation Theory</i></p> <p>Lectures at the Hadron Physics Summer School, Bad Honnef, Germany (August 2010) <i>From QCD to Hadron Physics I–III</i></p> <p>Talk at the Primeret Workshop, Lisbon, Portugal (September 2010) <i>Radiative corrections in $K \rightarrow \pi\ell^+\ell^-$ and related decays</i></p>
Rainer Sommer	11	<p>Minerva Symposium “Strings meet experiment”, Berlin, Germany, October 2009. <i>Lattice (connecting to strings)</i></p> <p>XXVIII International Symposium on Lattice Field Theory, Villasimius, Sardinia, Italy, June 2010. <i>The running coupling of QCD with four flavors</i></p> <p>STRONGnet 2010 Conference, Paphos, Cyprus, August 2010. <i>Lectures on: Introduction to non-perturbative HQET</i></p> <p>DESY Theory Workshop 2010, DESY, Hamburg, September 2010. <i>A predictive effective field theory: HQET on the lattice</i></p>
Michael Donnellan	11	<p>Meeting in honour of Chris Sachrajda on the Occasion of his 60th Birthday, Southampton, UK, December 2009. <i>Heavy Quark Effective Theory on the Lattice</i></p> <p>XXVIII International Symposium on Lattice Field Theory, Villasimius, Sardinia, Italy, June 2010. <i>The $B^*B\pi$ Coupling</i></p>
Gregorio Herdoiza	11	<p>XXVIII International Symposium on Lattice Field Theory, Villasimius, Sardinia, Italy, June 2010. <i>Towards four-flavour dynamical simulations</i></p>
Jochen Heitger	11	<p>XXVIII International Symposium on Lattice Field Theory, Villasimius, Sardinia, Italy, June 2010. <i>Heavy flavour dynamics from lattice QCD</i></p>

Dru Renner	11	Third Workshop on Theory, Phenomenology and Experiments in Heavy Flavour Physics, Anacapri, Capri, Italy, July 2010. <i>Towards precision heavy flavour physics from lattice QCD</i>
Francesco Virota	11	35th International Conference on High Energy Physics, Paris, France, July 2010. <i>Leading order hadronic contribution to $g-2$ from lattice QCD</i>
Andreas Athinodorou	11	XXVIII International Symposium on Lattice Field Theory, Villasimius, Sardinia, Italy, June 2010. <i>Auto-correlations in Hybrid Monte Carlo Simulations</i>
		STRONGnet 2010 Conference, Paphos, Cyprus, August 2010. <i>Lattice cutoff effects in lattice perturbation theory with $O(a)$ improved fermions</i>

3.5 General Networking

During the reporting period the FLAVIANet nodes have pursued an active scientific exchange. Here we list the visits focusing on research; visits devoted to training are listed in the Training Report.

Name	from Node no.	to Node no.	dates
Emilie Passemar	1	8 (IPN-Orsay)	12th - 17th November 2009
Emilie Passemar	1	8 (IPN-Orsay)	7th - 27th March 2010
Emilie Passemar	1	9 (ITP-Bern)	13th - 19th August 2010
Oscar Catà	1	10 (U. Ljubljana)	9th - 13th December 2009
Oscar Catà	1	5 (INFN-Napoli)	25th - 30th January 2010
Oscar Catà	1	5 (INFN-Napoli)	23rd - 27th February 2010
Oscar Catà	1	5 (INFN-Napoli)	16th - 19th May 2010
Oscar Catà	1	5 (INFN-Napoli)	3rd - 6th August 2010
Jorge Portolés	1	10 (U. Vienna)	27th June - 4th July 2010
Germán Rodrigo	1	2 (U. Granada)	28th - 30th October 2009
Germán Rodrigo	1	4 (U. Karlsruhe)	21st - 27th January 2010
Jose Rodriguez-Quintero	2	8 (LPT-Orsay)	18th - 21th November 2009
Jose Rodriguez-Quintero	2	8 (LPT-Orsay)	30th June- 1th July 2010
Jose Rodriguez-Quintero	2	8 (LPT-Orsay)	18th July- 1th August 2010
Diogo Boito	2	8 (IPN-Orsay)	15th April- 15th July 2010
Miguel Angel Escobedo	2	4 (Munich)	2nd-6th December 2010

Martin Beneke	4	3 (Southampton)	13th - 15th Dec 2009
Martin Beneke	4	9 (Zurich)	6th -8th Jan 2010
Martin Beneke	4	9 (CERN)	21st -25th Jun 2010
Andreas Crivellin	4	9 (CERN)	4th - 9th Jan 2010
Andreas Crivellin	4	10 (Ljubljana)	21th - 26st Feb 2010
Thorsten Ewerth	4	9 (U Bern)	10th - 14th May 2010
Jennifer Girrbach	4	9 CERN	14th - 16th Dec 2009
Jennifer Girrbach	4	9 CERN	4th - 6th Jan 2010
Ulrich Nierste	4	9 (CERN)	15th Oct 2009 - 15th Jan 2010
Ulrich Nierste	4	9 (ITP-Bern)	20th - 21st Oct 2009
Ulrich Nierste	4	11 (U Mainz)	9th - 10th Feb 2010
Ulrich Nierste	4	6 (U Warsaw)	27th - 31st Mar 2010
Matthias Steinhauser	4	6 (U Warsaw)	10th - 15th Jan 2010
Tobias Huber	4	10 (Ljubljana)	20th - 22nd Jan 2010
David Straub	4	5 (Pisa)	30 Nov - 2 Dec 2009
Stefan Recksiegel	4	10 (Ljubljana)	14th - 16th Apr 2010
David Palao	5	1 (Valencia)	26th Jan - 2nd Feb 2010
David Palao	5	1 (Valencia)	26th Jul - 18th Aug 2010
David Palao	5	2 (Barcelona)	14th Sep - 18th Sep 2010
Gino Isidori	5	4 (Munich)	4th Jan - 29th Jan 2010
Gino Isidori	5	4 (Munich)	3rd Apr - 23rd Apr 2010
Gino Isidori	5	4 (Munich)	2nd May - 12th May 2010
Gino Isidori	5	4 (Munich)	10th Jun - 15th Jul 2010
Giancarlo Rossi	5	11 (Zeuthen)	1st Jul - 31st Jul 2010
Giancarlo Rossi	5	9 (CERN)	1st Aug - 31st Aug 2010
Olga Shekhovtsova	5	1 (Valencia)	14th May - 17th May 2010
Nazario Tantaló	5	8 (Orsay)	20th Jan - 24th Jan 2010
Henryk Czyż	6	1 (IFIC)	21st Oct. - 22th Nov. 2009
Henryk Czyż	6	4 (KIT)	23rd Nov. - 22nd Dec. 2009
Henryk Czyż	6	4 (KIT)	11th Jan. - 10th Feb. 2010
Janusz Gluza	6	11 (Zeuthen)	31st Jan. - 6th Feb. 2010
Sergiy Ivashyn	6	1 (IFIC)	22nd Oct. - 18th Nov. 2009
Sergiy Ivashyn	6	4 (KIT)	11th Jan. - 10th Feb. 2010
Sergiy Ivashyn	6	5 (LNF)	14th April - 22nd April 2010

Sergiy Ivashyn	6	5 (LNF)	25th May - 2nd June 2010
Sergiy Ivashyn	6	11 (U.Mainz)	14th June - 25th July 2010
Mikołaj Misiak	6	9 (CERN)	1st Sept. - 21 Sept. 2010
Michał Poradziński	6	4 (KIT)	6th April - 29 June 2010
Michał Poradziński	6	4 (KIT)	6th July - 1st August 2010
Johan Bijmens	7	2 (U. Granada)	17-27 February 2010
Johan Bijmens	7	10 (U. Vienna)	26-30 November 2009
Ilaria Jemos	7	10 (U. Vienna)	26-30 November 2009
Karol Kampf	7	8 (U. Prague)	28-30 December 2009
Karol Kampf	7	8 (U. Prague)	7 days during 12/7-6/2010
Veronique Bernard	8	4 (Munich)	7th September - 10th September 2010
Benoit Blossier	8	11 (DESY-Zeuthen)	17th May - 19th May 2010
Benoit Blossier	8	4 (Munich)	7th September - 10th September 2010
Sebastien Descotes-Genon	8	5 (INFN-Bari)	8th November - 12th November 2009
Sebastien Descotes-Genon	8	4 (Munich)	7th September - 12th September 2010
Sebastien Descotes-Genon	8	3 (Durham)	14th September - 17th September 2010
Samuel Friot	8	4 (Munich)	7th September - 10th September 2010
Karol Kampf	8	4 (Munich)	7th September - 10th September 2010
Marian Kolesar	8	4 (Munich)	7th September - 10th September 2010
Laurent Lellouch	8	3 (Univ. Southampton)	13th December - 16th December 2009
Laurent Lellouch	8	5 (INFN-Bari)	8th November - 12th November 2009
Laurent Lellouch	8	9 (CERN)	18th July - 7th August 2010
Laurent Lellouch	8	4 (Munich)	7th September - 10th September 2010
Bachir Moussallam	8	4 (Munich)	7th September - 10th September 2010
Tri-Nang Pham	8	5 (INFN-Bari)	19th June - 23 June 2010

Eduardo de Rafael	8	2 (Univ. Barcelona)	15th April - 19th April 2010
Alberto Ramos	8	5 (INFN-Bari)	8th November - 12th November 2009
Alberto Ramos	8	3 (Univ. Southampton)	13th December - 16th December 2009
Alberto Ramos	8	4 (Munich)	7th September - 12th September 2010
Pablo Roig-Garcès	8	5 (INFN-Bari)	8th November - 12th November 2009
Pablo Roig-Garcès	8	1 (IFIC-Valencia)	18th November - 30th November 2009
Pablo Roig-Garcès	8	1 (IFIC-Valencia)	11th April - 17th April 2010
Pablo Roig-Garcès	8	1 (IFIC-Valencia)	2nd June - 6th June 2010
Pablo Roig-Garces	8	4 (Munich)	7th September - 10th September 2010
Hagop Sazdjian	8	5 (INFN-Bari)	19th June - 23 June 2010
Andrei Tayduganov	8	4 (KIT-Karlsruhe)	6th September - 18th September 2009
Andrei Tayduganov	8	4 (Munich)	7th September - 10th September 2010
Guillaume Toucas	8	5 (INFN-Bari)	8th November - 12th November 2009
Guillaume Toucas	8	9 (Bern)	20th June - 3rd July 2010
Guillaume Toucas	8	4 (Munich)	7th September - 10th September 2010
Martin Zdrahal	8	4 (Munich)	7th September - 10th September 2010
Juerg Gasser	9	10 (Wien)	11th - 24th Oct 2009
Juerg Gasser	9	10 (Wien)	22nd Nov - 5th Dec 2009
Peter Stoffer	9	1 (Valencia)	6th - 11th April 2010
Stefan Lanz	9	7 (Lund)	1. February - 31. July 2010
Svjetlana Fajfer	10	7 (U. Oslo)	20th - 24th September 2010
Beatrix Hiesmayr	10	5 (INFN Frascati)	3rd - 5th December 2009
Pere Masjuan	10	2 (UA Barcelona)	9th - 15th October 2009
Pere Masjuan	10	2 (UA Barcelona)	12th - 18th November 2009
Pere Masjuan	10	2 (UA Barcelona)	4th - 9th December 2009
Pere Masjuan	10	2 (UA Barcelona)	19th - 22nd February 2010

Pere Masjuan	10	2 (UA Barcelona)	4th - 12th June 2010
Dmitri Melikhov	10	5 (INFN Frascati)	2nd - 13th November 2009
Helmut Neufeld	10	9 (CERN)	10th - 12th December 2009
Helmut Neufeld	10	4 (TU Munich)	7th - 11th September 2010
Bastian Kubis	11	2 (Barcelona)	17th - 19th June 2010
Sebastian Schneider	11	9 (Bern)	6th June - 3rd July 2010
Akaki Rusetsky	11	8 (Paris)	16th - 17th February 2010
John Bulava	11	9 (CERN)	17th Jul - 13th Aug 2010
John Bulava	11	4 (Aachen)	12th - 13th July 2010
Rainer Sommer	11	9 (CERN)	17th Jul - 13th Aug 2010
Rainer Sommer	11	4 (Aachen)	12th - 14th July 2010
Ulli Wolff	11	9 (CERN)	17th - 24th July 2010
Stefan Schaefer	11	9 (CERN)	8th Jan - 13th Jan 2010
Stefan Schaefer	11	1 (Valencia)	24th Jun - 26th Jun 2010
Stefan Schaefer	11	9 (CERN)	18th Jul - 21th Jul 2010
Stefan Schaefer	11	9 (CERN)	28th Jul - 13th Aug 2010
Michael Donnellan	11	3 (Southampton)	14th - 15th December 2009
Michael Donnellan	11	4 (Aachen)	12th - 13th July 2010
Gregorio Herdoiza	11	2 (Barcelona)	13th - 18th Sept 2010
Gregorio Herdoiza	11	5 (Rome II)	24th - 30th Nov 2009
Gregorio Herdoiza	11	9 (CERN)	25th - 30th July 2010
Vincent Drach	11	2 (Barcelona)	15th - 17th Sept 2010
Dru Renner	11	8 (Orsay)	29th - 30th April 2010
Jochen Heitger	11	3 (Southampton)	8th - 11th March 2010
Jochen Heitger	11	9 (CERN)	6th - 13th Aug 2010
Karl Jansen	11	2 (Barcelona)	15th - 17th Sept 2010
Francesco Virota	11	5 (Bari)	9th - 11th Nov 2009
Francesco Virota	11	3 (Southampton)	14th - 15th Dec 2009
Francesco Virota	11	4 (München)	8th - 10th Sept 2010

Collaborations among the different nodes have resulted in several joint publications. We present the list of our common publications in the form of a matrix in Tab. 8 in order to display the networking aspect.

4 Economic spin-off

The spin-off company $\langle phi-t \rangle$ founded by the experimental CDF/BELLE group in node 4 is growing rapidly and continues to hire physicists who completed their PhD in flavour physics. Generally, private enterprises hire PhD students trained within Flavianet because of the computing skills developed during their thesis work.

5 Conclusions

FLAVIANet members have written more than 200 papers for refereed journals during the reporting period. We estimate that the FLAVIANet activity corresponds to at least 2/3 of the scientific output in theoretical flavour physics in Europe. Experimentalists in FLAVIANet were involved in numerous analyses of data from BaBar, BELLE, KLOE, CDF and, as a novel development, also of the CERN experiments. The visibility of FLAVIANet research at international conferences is evident from the talks listed in Sect. 3.4. Our annual network meetings, *Euro-Flavour 09* and *Euro-Flavour 10* were central events of our field of research in Europe. These meetings were complemented by other workshops and conferences organised by FLAVIANet members at their home institutions as described in Sect. 3.4.

FLAVIANet continues to foster transnational scientific cooperations, which resulted in common publications of different nodes (see Tab. 8). FLAVIANet brings people and their expertises together and actively contributes to a structured European science landscape.

	1	2	3	4	5	6	7	8	9	10	11
1	19	[3, 8–10, 21, 35–41]	[3, 19, 37–40, 74]	[2, 3, 19, 35–40, 116]	[3, 5, 7, 18, 19, 21, 25, 26, 31, 32, 35–40, 42–48]	[3, 19, 37–40]	[49]	[19, 23, 24, 27, 28, 35, 36, 50]	[3, 7, 19, 23, 29–32, 35–40, 42–49]	[3, 5, 21, 35–40, 137]	[7, 19, 21, 31, 32, 35, 36, 42–48]
2	[3, 8–10, 21, 35–41]	8	[3, 37–40, 57, 58]	[3, 35–40, 64, 65, 116]	[3, 21, 35–40]	[3, 37–40]		[35, 36, 60]	[3, 35–40, 175, 176, 245]	[3, 21, 35–40]	[21, 35, 36, 175, 176, 245]
3	[3, 19, 37–40, 74]	[3, 37–40, 57, 58]	21	[3, 19, 37–40, 71, 72, 87, 115, 116, 119]	[3, 19, 37–40, 80, 86, 87]	[3, 19, 37–40]		[19, 71, 115, 116]	[3, 19, 37–40, 71, 218, 246]	[3, 37–40]	[19, 71, 86, 218]
4	[2, 3, 19, 35–40, 116]	[3, 35–40, 64, 65, 116]	[3, 19, 37–40, 71, 72, 87, 115, 119]	15	[3, 19, 35–40, 87, 93, 96, 101, 109, 110, 116, 123, 125]	[3, 19, 37–40, 94, 102]		[19, 35, 36, 71, 104, 115, 116]	[3, 19, 35–40, 71, 93, 98, 119]	[3, 5, 21, 35–40]	[19, 35, 36, 71, 86, 93]
5	[3, 5, 7, 18, 19, 21, 25, 26, 31, 32, 35–40, 42–48]	[3, 21, 35–40]	[3, 19, 37–40, 80, 86, 87]	[3, 19, 35–40, 87, 93, 96, 101, 109, 110, 116, 123, 125]	14	[3, 19, 37–40]		[19, 35, 36, 246]	[3, 7, 19, 31, 32, 35–40, 42–48, 130–132, 246, 247]	[3, 21, 35–40, 137, 181–185, 191]	[7, 19, 21, 31, 32, 35, 36, 42–48, 86, 246]
6	[3, 19, 37–40]	[3, 37–40]	[3, 19, 37–40]	[3, 19, 37–40, 94, 102]	[3, 19, 37–40]	10		[19]	[3, 19, 37–40]	[3, 37–40, 195]	[19, 143, 145]
7	[49]						5	[154, 160]	[49, 158]	[158]	
8	[19, 23, 24, 27, 28, 35, 36, 50]	[35, 36, 60]	[19, 71, 115, 116]	[19, 35, 36, 71, 104, 115, 116]	[19, 35, 36, 246]	[19]	[154, 160]	12	[19, 23, 35, 36, 71, 246]	[35, 36, 181]	[19, 35, 36, 71, 159, 165–167, 206, 246]
9	[3, 7, 19, 23, 29–32, 35–40, 42–49]	[3, 35–40, 175, 176, 245]	[3, 19, 37–40, 71, 218, 246]	[3, 19, 35–40, 71, 93, 98, 119]	[3, 7, 19, 31, 32, 35–40, 42–48, 130–132, 246, 247]	[3, 19, 37–40]	[49, 158]	[19, 23, 35, 36, 71, 246]	5	[3, 35–40]	[7, 19, 31, 32, 35, 36, 42–48, 71, 175, 176, 205, 213, 218, 233, 245, 246]
10	[3, 21, 35–40, 137]	[3, 21, 35–40]	[3, 37–40]	[3, 5, 21, 35–40]	[3, 21, 35–40, 137, 181–185, 191]	[3, 37–40, 195]	[158]	[35, 36, 181]	[3, 35–40]	11	[21, 35, 36]
11	[7, 19, 21, 31, 32, 35, 36, 42–48]	[21, 35, 36, 175, 176, 245]	[19, 71, 86, 218]	[19, 35, 36, 71, 86, 93]	[7, 19, 21, 31, 32, 35, 36, 42–48, 86, 246]	[19, 143, 145]		[19, 35, 36, 71, 159, 165–167, 206, 246]	[7, 19, 31, 32, 35, 36, 42–48, 71, 175, 176, 205, 213, 218, 233, 245, 246]	[21, 35, 36]	18

Table 8: Joint publications of several nodes within the reporting period. Rows and columns correspond to the 11 nodes, the bibliographical items refer to the list of publications in Sect. 2. The diagonal elements (boxed boldface numbers) are the number of publications which the corresponding node wrote without participation of other nodes.