CV date	12/05/2024

Part A. PERSONAL INFORMATION

First name	Agustín		
Family name	Sánchez Losa		
Gender	Male	Birth date (dd/mm/yyyy)	21/07/1982
Social Security, Passport, ID number	70883969Q		
e-mail	Agustin.Sanchez@ific.uv.es	URL Web	ific.uv.es/~agusanlo
Open Researcher and Contributor ID (ORCID)		0000-0001-9596-7078	

A.1. Current position

Position	Investigador distinguido - CIDEGENT		
Initial date	01/04/2021		
Institution	Consejo Superior de Investigaciones Científicas (CSIC)		
Department/Center	Instituto de Física Corpuscular (IFIC)		
Country	Spain	Teleph. number	+34 963543538
Key words	Multi-messenger astronomy, Neutrino telescopes, Experimental Astroparticle Physics		

A.2. Previous positions

Period	Position/Institution/Country/Interruption cause
01/04/2020 – 31/03/2021	Contrato de investigador postdoctoral asociado, INFN, Bari (Italia)
07/02/2018 – 06/02/2020	Contrato de investigador postdoctoral asociado, INFN, Bari (Italia)
15/10/2015 – 14/10/2017	Beca de investigación postdoctoral, INFN, Bari (Italia)

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Doctorado en Física con Mención Internacional	Universitat de València	2015
Máster Universitario en Física Avanzada	Universitat de València	2010
Licenciado en Física (Plan 2000)	Universitat de València	2009

Part B. CV SUMMARY

My research centres around **Experimental Astroparticle Physics** with a specific emphasis on **multi-messenger observations**. In this approach, using the combined detection of different cosmic messengers we gain insights into their common origin. I have also been dedicated to the **engineering and calibration** of neutrino telescopes, ensuring that they are capable of accurately measuring and detecting neutrinos.

I have been an **active member** of both the **ANTARES** and **KM3NeT** international collaborations, where I have made important contributions to the development and operation of neutrino telescopes. My role has encompassed a wide range of responsibilities, including evaluation and problem solving, quality control and coordination, and a variety of tasks essential to advancing the development of these detectors.

I analysed ANTARES data in conjunction with X-ray and gamma-ray emissions from potential cosmic neutrino sources, such as **X-Ray Binaries** and **Active Galactic Nuclei**. The inclusion of the expected neutrino time emission as a constraint improves the point-like source search capabilities up to a factor of 2-3. For that purpose, I analysed data from Fermi, SWIFT and MAGIC observatories among others. I even developed a Bayesian method to enhance the accuracy of the emission period characterization. I also applied these methods to analyse ANTARES data during the IceCube neutrino flares observed in association with the blazar **TXS 0506+056**. These works have been presented in 8 contributions in international conferences and published in 3 papers.

I have played **several key roles in calibration** procedures for both ANTARES and KM3NeT, with a focus on time calibration, crucial for accurate event reconstruction and angular resolution in neutrino telescopes.

From 2010 to 2015, I coordinated the ANTARES time calibration and performed part of it. During my MSci, I developed procedures to carry out these and established monitoring requirements. Since 2016, I have been responsible for assembling all the ANTARES calibrations for both data processing and Monte Carlo production. Since 2020 I am the **coordinator of the calibration working group**.

In KM3NeT, I have been actively involved in the different time calibrations and have played a crucial role in establishing the calibration procedures for the KM3NeT Detection Units in the dark room, ensuring their smooth implementation for mass production. I have been responsible for coordinating and consolidating the calibrations from different integration sites. As a result of my experience, from 2018 to 2023 I have been trusted with the **Calibration Custodian** role, a figure that coordinates calibration releases, validity and applicability for data taking and analysis. For all this work the KM3NeT collaboration awarded me with the **Giorgos Androulakis Prize** in 2024.

From 2016 to 2021, I served as the **Local Quality Supervisor (ISO-9001 certified Internal Auditor)** at the KM3NeT integration site in **INFN in Bari**, Italy. My role was to ensure the necessary quality requirements for the feasibility of KM3NeT. I also actively participated in prototyping and assembling the crucial Base Modules of the detector, and trained other integration sites on this. My contributions helped establish procedures for efficient mass production of this component.

I have wide experience in ANTARES and KM3NeT detector operation, such as **run coordinator**, and participated in various sea operations. I have done numerous quality studies, including data and database integrity, made software contributions to both collaborations, and held internal editorial board positions.

I provided training in calibration and cosmic neutrino analysis techniques and assigned the internal review of multiple analysis in the collaborations. I supervised **two MSci thesis** in 2021, **two research stages** in 2022, **two students** in the **IFIC Summer School** 2022, a **JAE Intro** in 2023 and a **high school internship**. Currently, I am **supervising the PhD thesis work of three students** exploring different transient multi-messenger analyses in both ANTARES and KM3NeT.

I participate frequently in outreach activities, so far 9 open days and multiple school visits and talks to present my work field and explain my research. I have been part of the organizing committee for the VLVnT 2021, the CNID Workshop 2024 and multiple ANTARES-KM3NeT collaboration meetings and dedicated workshops.

My PhD was awarded with **The Global Neutrino Network Dissertation Prize** 2016, granted yearly to the most outstanding thesis in the neutrino telescope projects ANTARES, Baikal-GVD, IceCube and KM3NeT by the Global Neutrino Network.

I did long stays in relevant institutes of ANTARES and KM3NeT collaborations: Nikhef (Netherlands); CPPM (France); INFN – Sezione di Bari (Italy) where I accumulated 5 years of postdoctoral experience; IFIC (Valencia) where I did my MSci and PhD and since 2021 I work as **Distinguished Researcher with a CIDEGENT excellence grant**, with the **R3 certificate** obtained in 2023.

Part C. RELEVANT MERITS

C.1. Publications

1) "Search for Flaring Neutrino Sources with the ANTARES Neutrino Telescope", S. Alves Garre*, F. Salesa Greus and **A. Sánchez Losa**, on behalf of the ANTARES Collaboration, ICRC (2023).
DOI: https://doi.org/10.22323/1.444.1480
This contribution was a recent update of the sensitivities that ANTARES could achieve with the most up to date dataset on the search of cosmic neutrinos from transient sources, leaded by one of my students.

2) "Follow-up of multi-messenger alerts with the KM3NeT ARCA and ORCA detectors", J. Palacios Gonzalez, S. Celli, D. Dornic, F. Filippini, E. Le Guirriec, J. de Favereau de Jeneret, G. Illuminati, M. Lamoureux, M. Mastrodicasa, R. Muller, F. Salesa Greus, **A. Sánchez Losa**, S. Le Stum, G. Vannoye, A. Veutro and A. Zegarelli, on behalf of the KM3NeT Collaboration, ICRC (2023).
DOI: https://doi.org/10.22323/1.444.1521

This contribution was a recent update of the sensitivities that ANTARES could achieve with the most up to date dataset on the transient search of high-energy neutrinos from X-ray and gamma ray binaries, leaded by one of my students.

3) "Refined neutrino follow-up analysis of GRB 221009A with KM3NeT ARCA and ORCA detectors", J. Palacios Gonzalez, S. Le Stum, D. Dornic, F. Filippini, G. Illuminati, F. Salesa Greus, **A. Sánchez Losa**, G. Vannoye and A. Zegarelli, on behalf of the KM3NeT Collaboration, ICRC (2023). DOI: https://doi.org/10.22323/1.444.1503

This contribution was a recent update of the sensitivities that ANTARES could achieve with the most up to date dataset on the transient search of high-energy neutrinos from X-ray and gamma ray binaries, leaded by one of my students.

4) "A Narrow Optical Pulse Emitter Based on LED: NOPELED", Diego Real et al. (5^{th}/5), Sensors 2022, 22(19), 7683. DOI: https://dx.doi.org/10.3390/s22197683

Corresponding author. This article presents a generic multipurpose pulsed LED system, like those used in ANTARES and KM3NeT for calibration.

5) "Science with Neutrino Telescopes in Spain", Juan José Hernández-Rey et al. (11^{th}/13), Universe 2022, 8(8), 89. DOI: https://dx.doi.org/10.3390/universe8020089

Significant contribution to the writing. In this article is reviewed the research performed by the Spanish physics community working in the KM3NeT and ANTARES detectors on neutrino astronomy among other topics related to neutrino telescopes.

6) "Nanobeacon: A time calibration device for the KM3NeT neutrino telescope", KM3NeT Collaboration, NIM-A 2022, Vol. 1040, 167132. DOI: https://dx.doi.org/10.1016/j.nima.2022.167132

Editorial board. This article describes one of the optical beacon devices of the KM3NeT detector for calibration and water property studies.

7) "Astronomy with Neutrinos", F. Salesa Greus & **A. Sánchez Losa**, Universe 2021, 7(11), 397. DOI: https://doi.org/10.3390/universe7110397

Corresponding author. This short review on multi-messenger astronomy with neutrinos is written per invitation together with another colleague.

8) "The Search for Neutrinos from TXS 0506+056 with the ANTARES Telescope", ANTARES Collaboration, The Astrophysical Journal Letters 2018, Vol. 863 L30, 5 pp. DOI: https://dx.doi.org/10.3847/2041-8213/aad8c0

Significant contribution producing the results. In this article are presented the results of three different searches for neutrino candidates, associated with the IceCube-170922A event or from the direction of TXS 0506+056, by the ANTARES neutrino telescope, the third one performed by me.

9) "Time-dependent search for neutrino emission from x-ray binaries with the ANTARES telescope", ANTARES Collaboration, Journal of Cosmology and Astroparticle Physics 2017, Vol. 10, p. 019. DOI: https://dx.doi.org/10.1088/1475-7516/2017/04/019

Corresponding author. A time-dependent search of neutrinos from a list of 33 X-ray binaries. Even if no significant detection was found, the derived upper limits constrain the jet parameter space for some astrophysical models.

10) "Search for muon neutrino emission from GeV and TeV gamma-ray flaring blazars using 5 years of the ANTARES Telescope", ANTARES Collaboration, Journal of Cosmology and Astroparticle Physics 2015, Vol. 12, p. 014. DOI: https://dx.doi.org/10.1088/1475-7516/2015/12/014

Corresponding author. A time-dependent analysis applied to a selection of the most significant flaring blazars with Fermi and TeV Cherenkov telescopes data. Results were compatible with background fluctuations, providing limits on the neutrino fluence.

C.2. Congress

1) "KM3NeT Time calibration with Nanobeacons", A. Sánchez Losa et al. on behalf of the KM3NeT Collaboration, ICRC 2023, Nagoya (Japan). **Poster.** DOI: https://doi.org/10.22323/1.444.1062

2) “Multi-messenger Astronomy with High-Energy Neutrinos”, A. Sánchez Losa, COST "Quantum gravity phenomenology in the multi-messenger approach" Workshop 2022, Naples (Italy).
Invited talk. Link: https://indico.capa.unizar.es/event/22/contributions/342/
3) “KM3NeT/ARCA sensitivity to transient neutrino sources”, J. Palacios González, M. Colomer Molla, F. Salesa Greus and A. Sánchez Losa on behalf of the KM3NeT Collaboration, ICRC 2021, Berlin (Germany). **Poster.** DOI: https://dx.doi.org/10.22323/1.395.1162
4) “Status and Prospects of Mediterranean Neutrino Telescopes: KM3NeT & ANTARES”, A. Sánchez Losa on behalf of the ANTARES & KM3NeT Collaborations, TEXAS 2019, Portsmouth (England).
Talk. Link: https://texas2019.org/x-rays/#P3
5) “Latest results on high-energy cosmic neutrino searches with the ANTARES neutrino telescope”, A. Sánchez Losa on behalf of the ANTARES Collaboration, UHECR 2018, Paris (France).
Talk. DOI: https://dx.doi.org/10.1051/epjconf/201921003004
6) “Time-dependent search of neutrino emission from X-ray and gamma-ray binaries with the ANTARES telescope”, A. Sánchez Losa on behalf of the ANTARES Collaboration, ICRC 2017, Busan (South Korea). **Talk.** DOI: https://dx.doi.org/10.22323/1.301.0971
7) “Time-dependent search of neutrino emission from bright gamma-ray flaring blazars with the ANTARES telescope”, A. Sánchez Losa on behalf of the ANTARES Collaboration, ICRC 2017, Busan (South Korea). **Poster.** DOI: https://dx.doi.org/10.22323/1.301.0970
8) “Results from the ANTARES Neutrino Telescope”, A. Sánchez Losa on behalf of the ANTARES Collaboration, RICAP 2016, Frascati (Italy). **Talk.**
DOI: https://dx.doi.org/10.1051/epjconf/201713604002
9) “Time-dependent search of neutrino emission from X-ray binaries with the ANTARES telescopes”, D. Dornic and A. Sánchez Losa on behalf of the ANTARES Collaboration, ICRC 2015, The Hague (Netherlands). **Talk.** DOI: https://dx.doi.org/10.22323/1.236.1046
10) “Transient point source analyses in the ANTARES neutrino telescope”, A. Sánchez Losa on behalf of the ANTARES Collaboration, RICAP 2013, Rome (Italy). **Talk.**
DOI: https://dx.doi.org/10.1016/j.nima.2013.11.096

C.3. Research projects

Projects as Principal Investigator:
1) “Multimessenger astronomy in the KM3NeT observatory: gravitational waves, gamma rays and cosmic neutrinos”, ~410 k€, Plan GenT-Modalidad 1, ref. CIDEGENT/2020/049, regional funding (Comunitat Valenciana, Spain), 2021-2025.
Projects as a member of the research group:

2) “Contribución del CSIC al proyecto ESFRI KM3NeT 2.0: impulsando la investigación en astrofísica y física fundamental”, ~100 k€, ref. INFRA23013, "Programa CSIC en Grandes Infraestructuras de Investigación Europeas", national funding (Spain), 2023-2025.

3) “Telescopios de neutrinos para física fundamental y astronomía multi-mensajero (NOSTRUM) en el IFIC”, ~920 k€, ref. PID2021-124591NB-C41, "Programa Estatal para Impulsar la Investigación Científico-Técnica y su Transferencia - Subprograma Estatal de Generación de Conocimiento", national funding (Spain), 2022-2025.

4) “Participación del IFIC en ANTARES Y KM3NET”, ~240 k€, ref. FPA2012-37528-C02-01, "Proyectos de Investigación Fundamental no Orientada 2012", national funding (Spain), 2013-2015.

5) “Participación del IFIC en los telescopios de neutrinos ANTARES Y KM3NET”, ~800 k€, ref. FPA2009-13983-C02-01, "Programa Nacional de Formación de Recursos Humanos de Investigación 2010", national funding (Spain), 2010-2012.