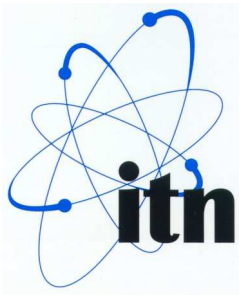

Photonuclear data for (computational) Shielding and Dosimetry

Pedro Vaz - ITN/DPRSN
Bacerlona 28-29 October 2004

ITN
The Nuclear & Technological Institute (Lisbon)

- ✓ Department of Radiation Protection and Nuclear Safety
  - Specific competence and expertise in
    - **Radiation Protection**
    - **Shielding**
    - **Dosimetry**

- ✓ Physics Department

- ITN identifies its participation in this design study as a good opportunity to strengthen the cooperation with Spanish institutions

- Need to widely publicise ALBA/AURORA within the Portuguese scientific community
  - Academia and research centers
  - Going beyond the nuclear physics community

Photonuclear data for (computational) Shielding and Dosimetry

- Justification to new measurements:
  - cross-section data needed for (more) accurate radiation transport calculations
    - (accelerator) Shielding design
    - Dosimetry
    - Activation
  - Lack of or insufficient data
    - “poor” coverage of energy range(s)
    - Limited number of nuclides
  - Explore/quote (if any) statements from
    - WPEC (Working Party on Evaluation Cooperation) and
    - HPRL (High-Priority Request List)

Photonuclear data for (computational) Shielding and Dosimetry

- The existing data (intense data collection in recent years)
  - Data Libraries
    - **IAEA Photonuclear Data Library**
    - **EXFOR database**
    - **others**

- The needs for more accurate or new data were set out by different groups of experts/communities
    - ***SATIF – Shielding Aspects of Accelerators, Targets and Irradiation Facilties***, Task Force under the auspices of the Nuclear Science Committee of the OECD/Nuclear Energy Agency

Photonuclear data for (computational) Shielding and Dosimetry

- Summary of the SATIF-7 Meeting (May 2004)
  - " The provision of a gamma-beam-line for nuclear physics and applications at the AURORA facility was reported. It was noted that there is a lack of photonuclear data available for light elements and those available are for a limited range and often of poor quality. Data for production of d,t and alphas with their spectra are required..."
  - "The availability of such a facility is most welcome"
- SATIF group identifies the collection, availability and dissemination of photonuclear data as a high-priority (on-going) action

Photonuclear data for (computational) Shielding and Dosimetry

- As usual, computer codes (developpers and community of users) are major driving forces to
  - Identify data needs
  - Perform benchmark exercises
  - Validate physics models
  - Trigger data collection efforts
  - Disseminate (through the availability of associated libraries) data

Photonuclear data for (computational) Shielding and Dosimetry

- Strong links should be fostered with code developpers
  - FLUKA, MCNPX ⇐ photonuclear data
    - Paper by A. Fasso et. al. @ ND 2004
  - photon transport including polarization effects
    - EGS4(5) ⇐ KEK group (Hirayama et. al.)
    - PENELOPE ⇐ Cesc Salvat´s group