Atomic, molecular and optical research in Argentina

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The first laboratory in Argentina dedicated to Atomic, Molecular and Optical (AMO) Physics was created in 1960 by Prof. Wolfgang Meckbach. It is located at the Bariloche Atomic Centre (CAB) and depends on the National Atomic Energy Commission (CNEA). Today, the "Department of Interaction of Radiation with Matter" (DIRM) includes three divisions in AMO Physics, Fusion Research and Surface Science. Among its experimental facilities we should mention a 1.7 MeV Tandem accelerator with PIXE, RBS, ERDA and channelling capabilities, and a chamber for Cold Target Recoil Ion Momentum Spectroscopy (COLTRIMS). There are also two electrostatic accelerators of 100 and 300 keV, a time-of-flight system for ISS spectroscopy, a surface analysis equipment for XPS, UPS, AES and SIMS spectroscopy, and STM and atomic force AFM microscopes.

Other AMO institutes in Argentina, as for instance the Institute of Astronomy and Space Physics (IAFE) in Buenos Aires, the Rosario Institute of Physics (IFIR) in Rosario, and the Southern Physics Institute (IFISUR), created in Bahía Blanca in 2008, are mostly devoted to theoretical research.

The AMO community in Argentina study a large range of processes, with different projectiles (ions, electrons, positrons, photons, etc.), targets (atoms, molecules, surfaces, etc.) and outgoing channels (elastic and inelastic collisions, charge exchange, ionization, transfer ionization, etc.), usually at intermediate and large impact energies. From the theoretical point of view, we employ Continuum Distorted Wave models, Classical Trajectory Montecarlo, Sturmian functions, and time-dependent close coupling, among other techniques.

CNEA also counts with a 20 MeV tandem accelerator at the Constituyentes Atomic Centre (CAC), and an Accelerator Mass Spectroscopy (AMS) facility at the Ezeiza Atomic Centre (CAE), both located in Buenos Aires.

Argentina participates in the Management Board for the Development, Application and Validation of Nuclear Data and Codes (MBDAV) of the Nuclear Energy Agency (NEA-OECD), and -in particular- in the Joint Evaluated Fission and Fusion (JEFF) collaboration. Furthermore, through the Radioisotope Metrology Laboratory (LMR) and the Ionizing Radiation Dosimetry Laboratory at the CAE, Argentina is part of the Ionizing Radiation Advisory Committee of the Bureau International des Poids et Mesures (BIPM) and the International Committee for Radionuclide Metrology (ICRM).

At present, CNEA is creating the "Argentinean Network for Nuclear, Atomic, Molecular and Optical Data and Codes", or DINAMO (for to its acronym in Spanish). Its objectives are to provide fundamental data for nuclear and non-nuclear science and technological projects (for example in nuclear medicine, radioisotope production, radioactive waste management, uranium enrichment, and fusion), and to coordinate the generation, collection and critical assessment of data by the different groups in Argentina. In particular, this network is intended to act as a point of contact and liaison with the nuclear data section and the atomic and molecular data unit of IAEA, the data bank of NEA-OECD and BIPM.

Therefore, based on our 50 years of experience in AMO research, we are willing to contribute with the international atomic and molecular data centre network. We can certainly provide numerical and bibliographic data, direct contact for any expertise needed -especially in relation with ion impact atomic processes and surface science- and collaborate with ongoing and future coordinated research projects.