The Spanish National Center for Accelerators (CNA): a small-medium installation for accelerator multidisciplinary research

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The National Center for Accelerators (CNA) is a Spanish Centre for interdisciplinary research with accelerators. It is located at Seville, South-Western Spain, and is jointly operated by the University of Seville, the Spanish CSIC and the Andalousian government. The CNA is open to Universities, other public or private research institutions, hospitals, industrial companies, etc. And many groups from these institutions, mostly from Spain, but also from other countries, carry out their investigations in the CNA. Research projects in Nuclear Physics, Material Science, Biomedicine, Archaeology, Environmental Sciences, etc. are currently implemented in CNA.

Up to now there are 3 accelerators in the Centre: a 3 MV tandem van de Graaff, an 18 MeV (9 MeV) protons (deuterons) cyclotron and a 1 MV tandem Cockcroft-Walton for AMS applications.

Virtually all IBA techniques are possible with the 3 MV tandem, which has 7 beam lines. Thus, PIXE, RBS, PIGE, etc. analysis are possible with macro or micro-beams, since a Nuclear Microprobe is also available in one of the beam lines with a spatial resolution of around 1 μm. Nuclear Physics research….

The cyclotron has 8 beam-lines. 7 are devoted to the production of PET nuclides. Besides it a Radiopharmacy facility serves to produce radiopharmaceuticals which are distributed to Hospitals or to the laboratory for Biomedicine research also installed near the cyclotron. One beam-line is used for investigations in the field of irradiation of materials, as electronic components of use in the aerospace industry or other components in solar energy research and applications.

So far, the AMS accelerator is able to measure ^{10}Be, ^{14}C, ^{26}Al, ^{129}I and Pu-isotopes with different purposes. The main application of the spectrometer is ^{14}C dating by AMS. In fact, the ^{14}C dating service of the CNA is the only one in Spain using AMS. Nevertheless, there are additional current applications of the AMS system. Indeed, ^{129}I and Pu-isotopes measurements are carried out within different research projects in environmental applications and Oceanography.