HiSPAlis Neutron Source (HiSPANoS) at CNA: installation and commissioning of the first neutron time of flight beamline in Spain

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A few years ago the Spanish National Accelerator Lab (CNA) developed the first accelerator-based neutron facility in Spain, HiSPANoS (Hispalis Neutron Source). The first applications of the line were related to integral measurements applied to nuclear astrophysics [1,2], dosimetry [3] and single event effects produced by neutrons in electronic devices [4].

The success of HiSPANoS pushed the enhancement of the facility. A new experimental line of the Tandem accelerator was designed for neutron time-of-flight (TOF) experiments. In collaboration with the NEC Company, two devices were designed for pulsing ion beams (chopper) and for compressing in time (buncher) the pulsed beams, providing proton [5] and deuteron 1 ns pulse width beams with repetition rates from 62.5 kHz to 2 MHz .

The goal of the commissioning was the measurement of the ^{7}Li(p,n)^{7}Be (Ep = 1912 keV) angular-energy neutron field at the implemented HiSPANoS time-of-flight facility at CNA. It can be considered a standard neutron field, in particular in nuclear astrophysics [6]. In order to carry out the measurement, it became essential to develop a lithium-metallic target, acquisition system, and data analysis. The optimal performance of the accelerator, the chopper-buncher system, and the TOF line, supported by the excellent experimental results [7], allows us to offer HiSPANoS as a user facility to the neutron community.

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