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Polarex, a future facility for on line nuclear orientation

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Low temperature nuclear orientation (LTNO) allows to study polarized exotic nuclei. At very low temperature ($\sim 10\text{mK}$) nuclei can experience a very high polarization in the hyperfine field which exists into a ferromagnetic metal host. The decay products can be observed using proton, alpha or beta-particle detectors fitted within the cryostat and/or external gamma or neutron detectors, providing a very versatile instrument.

Oriented nuclei give access to a wide range of experiments. These include a precise measurement of nuclear moments using the NMR technique and the observation of beta-decay to, and gamma emission from, excited states in the daughter nucleus to study aspects of nuclear structure. As a special feature of LTNO, far-reaching studies of fundamental weak interactions and associated symmetries can be made as well as investigations of parity non conservation.

PolarEx (Polarization of Exotic nuclei) is a facility dedicated to this kind of study through the decay of polarized nuclei that will run on-line at the ALTO facility at Orsay, France. This experimental setup is also designed to give a large access for the detection system: up to eight germanium detectors can be fitted in the plan perpendicular to the orientation axis to study the spatial asymmetry of the gamma radiation.

At PolarEx, long lived nuclei can be studied OFF-line while the direct implantation of the nuclei produced at ALTO into PolarEx will open a wide range of ON-line experiments with exotic nuclei (with typical lifetimes as short as 1 second). In particular, a precise measurement of nuclear moments can be made using the NMR technics. Also, one can reach the level spins in the daughter nucleus, the aspects of nuclear structure based on gamma multi-polarity and the parity non-conservation in nuclear decay. As a special feature of PolarEx, far-reaching studies of fundamental weak interactions and associated symmetries can be done.

In this contribution will be presented the status of Polarex and the on going off-line studies, in particular the new measurements of the multipole mixing ratios in ^{56}Fe .

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