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Nuclear structure studies at the FIPPS instrument at ILL

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The Fission Product Prompt gamma-ray spectrometer (FIPPS) is the new nuclear physics instrument at the Institut Laue-Langevin (ILL). FIPPS takes advantage of an intense pencil-like neutron beam (flux 10^8 n/s/cm^2) for inducing neutron capture and neutron induced fission reactions and study the nuclear structure via high resolution gamma-ray spectroscopy. The array is composed by 8 Compton suppressed HPGe clover detectors. Ancillary devices are possible, as LaBr_3 detectors for fast timing measurements or additional clover detectors (from the IFIN-HH collaboration) to increase efficiency and granularity.

After a general introduction on the main features of the instrument, recent developments to improve the energy resolution and the sensitivity of the instrument for fission studies will be reported. In particular, the procedure and effects of the correction for the cross-talk among the crystals in a same clover will be reported. The setup and results from the first test of a diamond-base active target for neutron induced fission will be reported. These results will be shown with the ones from the well-established scintillator-based active target used at FIPPS in recent campaigns. The use of a fission tag allows for an identification of transitions from weak branches and/or isotopes produced with small fission yields.

Finally, the recently developed GEANT4 simulation code will be presented, with particular focus on the angular correlation analysis with hybrid gamma-ray arrays and on the first simulations for the development of a plunger device for lifetime measurements in fission fragments.

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