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Investigation of excited states in 76As of interest for 0νββ decay

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Since many years the quest for experimental evidences for the neutrino less double beta decay is open. Such measurement would imply the neutrino being identical to its antiparticle, therefore being a Majorana particle. A measurement of the lifetime for this process would lead to a precise estimation of the neutrino mass. However, very precise nuclear physics data are needed to achieve an accurate theoretical prediction. Indeed, the predicted lifetimes and decay rates may vary by many factors depending on the nuclear interaction
chosen, and more and more precise nuclear physics information is needed to match the experimental sensitivity
of planned neutrino experiments. Large experimental efforts have been perform to study, theoretically [1] and experimentally [2, 3], the double beta decay of 76Ge to 76Se. While a crucial role is played by the wavefunctions of the mother ground state and the low-lying states of the daughter, theory shows that a non-negligible role can be played by the structure of the intermediate 76As [4]. An experiment is planned with the FIPPS apparatus at ILL, which aims at an unambiguous identification of the 1+ levels of 76As. Such identification would help theory constrain the matrix elements of the double beta decay. Such levels will be identified using γ-ray spectroscopy techniques after (n,γ) reactions on 75As. The spin and parity assignation of the excited levels will be possible thanks to angular correlation measurements.
Preliminary results from the FIPPS experiments will be shown as well as the characterization of the performance of the instrument.

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