

A new neutron time-of-flight array for beta-decay studies

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The LPC Caen, in collaboration with CIEMAT (Madrid), is developing a new neutron time-of-flight array for structure studies, in particular the investigation of beta-delayed neutron emission from neutron-rich nuclei.

Our aim is an array with improved performance compared to existing arrays, with emphasis on better energy resolution, lower neutron energy threshold, and strong background rejection capability. The latter characteristic is crucial for multiple neutron detection, in order to study the most neutron-rich nuclei that can emit two or more delayed neutrons. Our development strategies involve the use of scintillators allowing neutron-gamma discrimination, and of digital DAQ and signal processing, as well as the characterisation of detectors with monoenergetic neutrons to measure intrinsic efficiencies and cross-talk probabilities.

A first version of the array will be used at ISOLDE in an experiment on the coincident detection of 2 neutrons following the decay of ^{11}Li .

This talk will present the status of our development, in particular the performance of neutron-gamma discrimination with digital DAQ and the detector characterisation with monoenergetic neutrons.

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