

“RIPTIDE” – An innovative recoil-proton track imaging detector

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Neutron detectors perform key tasks in the development of many research fields, as nuclear, particle and astroparticle physics as well as neutron dosimetry, radiotherapy, and radiation protection. Until now, no neutron detector exhibits tracking capability (i.e., full neutron-momentum reconstruction) even if several projects are in progress [1-7]. To address this deficiency, we aim at developing a novel Recoil-Proton Track Imaging DEtection system “RIPTIDE”, in which the light output of a fast scintillation signal is used to perform a complete reconstruction in space and time of the neutron-proton elastic scattering. Preliminary Geant4 simulations of the proposed set-up show up a good detection efficiency in a compact active volume. In addition, the proposed electronic readout can be easily adapted according to a specific application (event-by-event mode or integration mode). In principle, the system can be also rescaled by increasing the detection volume or by combining several detection modules. Finally, further development of the basic detection technique can be adapted for fast charged particle detection tracking.

In this contribution, we will present the RIPTIDE concept together with some preliminary results.

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