

The diverse uses of inverse-kinematics neutron beams

From new insight into fission mechanism to fast neutron tomography



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Abstract

For the last decade we have been developing and perfecting the production of naturally collimated fast neutron beams at the ALTO facility of IJC Lab, Orsay [1]. Inverse-kinematics nuclear reactions offer the possibility of producing neutrons in a unique way, leading to focused, high-flux beams with a low room background. These developments of the neutron source, named LICORNE [2], have opened up a whole new range of opportunities for fundamental and applied physics experiments. For fundamental physics these range from the precision spectroscopy of neutron induced reactions, exploration of the nuclear structure of exotic neutron-rich isotopes [3] and the study of the fission reaction mechanism [4]. For applications, directional fast neutrons are being used for fast neutron tomographic imaging, geochronology studies [5] and detector testing for direct Dark Matter searches [6] and the NUMEN project. In this presentation I intend to outline the technical developments and show some of the highlights of results from the physics program.

References

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