Spectroscopy of prompt fission decay processes induced with fast directional neutrons

J. N. Wilson[1]

[1] IPN Orsay,15 rue G. Clemenceau, 91406 Orsay cedex, France

At the IPN Orsay we have recently developed an unusual kind of neutron source which produces high fluxes of directional fast neutrons. The directionality is achieved by using nuclear reactions which produce neutrons in inverse kinematics assuring that neutrons are emitted in focussed cones. Standard neutron sources emit neutrons almost isotropically and so the natural directionality of the source, which we call LICORNE, opens up a whole range of new scientific opportunities. This presentation will describe the kind of fundamental and applied physics that can be performed with such a source – a physics program under development at the IPN. These include the high resolution spectroscopy of fast neutron induced nuclear reactions, the study of nuclear fission, the production and study of exotic neutron-rich nuclei. Of particular relevance are the recent results obtained on prompt gamma ray emission in the fission process, where models which reproduce the statistical neutron and gamma decay of the hot fission fragments require accurate level density information to reproduce spectral shapes.
