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Design and study of the 8kW Diagnostic Box for the SPES proton beam line

Friday, 22 September 2017 14:30 (25 minutes)

The SPES project (Selective Production of Exotic Species) is a second-generation ISOL facility under construction at the LNL. The aim is the production of radioactive ion beams on the neutron rich side of the nuclide chart for nuclear structure and reaction studies, astrophysics research and interdisciplinary applications. The heart of the facility is the multi-foil UCx target where the fission of the uranium atoms induced by a 40 MeV proton beam occurs. The 8 kW of beam power delivered to the target produces about 1013 fissions per second and maintains the target at high temperatures, on the order of 2200℃, to let the products effuse out of the disks and diffuse to the ion source.
In this talk, the studies carried out on the target and the beam properties requested will be presented and some of the possible failure scenarios on the beam managing discussed. On the other hand, the overall assembly on the proton beam line inside the production bunker will be analysed inasmuch it has to support the beam and characterize it. The main constraints on the design were the dissipation of the beam power, the overall dimensions and the high radioactive environment due to the huge neutron flux produced by the uranium irradiation.

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