

LIEBE: Design of a molten metal target based on a Pb-Bi loop at CERN-ISOLDE.

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Future perspective for physics measurements at CERN-ISOLDE call for the use of molten metal targets to improve the yield of radioactive isotopes delivered to the experiments and better handle the high power density from the beam. CERN launched in 2012 an R&D project called Liquid Eutectic Lead Bismuth Loop Target for Eurisol (LIEBE) to investigate the feasibility of testing on line a Pb/Bi loop target compatible with the present installations at ISOLDE. While ISOLDE will be able to deliver a maximum of 10 kW of beam power, the power density on target is comparable to those available in existing or future facilities as EURISOL.

The design of the loop has been performed in collaboration between SCK-CEN, CEA, PSI, IPUL, SINP and the prototyping phase has now started. All the key elements integrated in the design such as a heat exchanger to evacuate the high power deposited by the beam, an electromagnetic pump to ensure the circulation of liquid metal, an irradiation chamber and a diffusion chamber to allow a faster release of the produced isotopes have been studied in details and will be tested extensively before installation on-line.

This talk focuses on the development of the element of the liquid metal loop target, presenting the challenges due to the different constraints involved and introducing the solutions proposed. Finally, an overview of the results of preliminary tests will be presented.

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