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ESS target station concept

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Abstract

A variety of spallation neutron sources has been operating with excellent environmental safety record over the past 4 decades. The main challenge for the target station concept of the European Spallation Source (ESS) is to achieve the same or even higher level of safety and environmental friendliness than its predecessors, in spite of its much higher proton beam power of 5 MW. A critical analysis of the most fundamental safety issues leads to the unavoidable conclusion that this cannot be achieved by any of the target station designs by now implemented for use at past or existing spallation sources. ESS has selected the novel approaches of rotating solid tungsten target as the baseline and liquid metal lead-bismuth-eutectics (LBE) as comparative target option. Key features of both of these approaches have been extensively studied in the past to various levels of detail. The presentation will focus on the basic issues of feasibility, lay-out, performance, lifetime, handling, safety and waste disposal related to the target choice at ESS.