

The neutronic design of the ESS target

L. Zanini¹, K. Batkov¹, F. Mezei¹, A. Takibayev¹

¹European Spallation Source ESS AB, PO BOX 176, 22100 Lund, Sweden

F. Sordo², J.P. de Vicente², F.J. Bermejo²

² Consorcio ESS-BILBAO, Instituto de Fusión Nuclear, Universidad Politécnica de Madrid-ETS Ingenieros Industriales, C\ José Gutiérrez Abascal, 2, 28006 Madrid

luca.zanini@esss.se

Abstract

Starting operations in 2019, the European Spallation Source (ESS) will be a pulsed neutron source with an unprecedented brightness, thanks to a 5 MW proton beam (2.5 GeV at 2 mA) impinging on a high-density target.

The goal of the design update phase is to reach by the end of 2012 a technical design, where a sound solution for a valid target system must be discussed in detail. The neutronic characterization is at the core of the work, and consists of different topics; on one hand, the effort is related on studying lessons learned from existing sources, on investigating libraries and models, to make the best use of existing knowledge and tools; on the other hand, neutronic studies are interfaced with the accelerator and with the engineering design, most of the work being done by using Monte Carlo codes. In this paper a global overview of the most important problems, and the current status of the work, is discussed.