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Neutronic Studies in Support of Engineering Design and Optimization of the ESS Target System

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Abstract

The European Spallation Source (ESS) target system will produce long pulses of cold and thermal neutrons through interaction of 5 MW proton beam with helium cooled tungsten target and subsequent thermalization of spallation neutrons in cryogenic and ambient moderators. To fully utilize the potential of the proton beam, the target system layout must be carefully designed and optimized. In the study presented, neutronic input to engineering design and optimization of the ESS target system is discussed. Particular emphasis is laid upon the constraints imposed on design and optimization by the quality of nuclear data and nuclear interaction models.