

Thermal Hydraulic Design of the Double-walled Mercury Target Vessel

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Cavitation damage of the target vessel wall which is caused by the pressure wave in mercury induced by the pulsed high power proton beam injection is the crucial issue for the development of the high power mercury target. Based on the analytical and experimental studies and also on the operational experiences of SNS, the effect of the rapid mercury flow to mitigate the cavitation damages seems obvious. In order to include this effect into the JSNS mercury target design, we applied doubled-walled structure to the beam window of the target vessel. The mercury flow velocity in the narrow channel between the double walls increases to almost 4 m/s, which should suppress the cavitation damages. In this presentation, the thermal hydraulic design of the double-walled target will be shown including the case of the failure of the inner wall.

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