

Damage inspection of mercury target vessel operated at 1 MW in J-PARC neutron source

Tuesday, 29 October 2024 15:20 (25 minutes)

At the Materials and Life Science Experimental Facility (MLF) in J-PARC, liquid mercury target for the pulsed spallation neutron source is in operation. A target vessel made of SS316L is damaged by pressure wave induced cavitation in mercury in addition to the 3 GeV proton and neutron irradiation. We are improving the target vessel to mitigate the cavitation erosion and gradually ramping-up the proton beam power for the goal of 1 MW 25 Hz, 1 MW stable operation in two month was achieved in May, 2024. To demonstrate the mitigation effect, beam window portion of the vessel was cut and inspect the depth of erosion. Furthermore, correlation between the erosion depth and beam induced acoustic vibration during operation are investigated to reflect the in-situ prediction of damage mitigation effect during operation. In the workshop, recent progress of mercury target in J-PARC will be introduced mainly result of damage inspection of 1MW-operated target.

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Session Classification: Liquid/solid and particle beam interactions and associated studies: pressure waves, cavitation, erosion, corrosion etc and mitigation techniques

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