

Last updates of the R&D activities for the redesign of the CERN's AD-Target

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This study presents the last updates regarding the R&D activities for the redesign of the CERN's Antiproton Decelerator (AD) production target, which are taking place in the context of the AD-Target area Consolidation project.

These updates include the manufacturing of a first scaled prototype of the target, constituted by a sliced core of 8 mm diameter Ta rods embedded in a compressed expanded graphite (EG) matrix, and its testing under proton beam impacts at the CERN's HiRadMat facility in 2017, within the so called HRMT-42 experiment. The experiment counted on online instrumentation recording the velocity at the target's periphery, providing information of its dynamic response and damping properties of the EG matrix. Furthermore, x-ray and neutron topographies have been complementarily used to inspect the target after irradiation, suggesting that the EG matrix can successfully adapt to the swelling of the Ta core due to extensive plastic deformation induced by the dynamic stresses. The neutron tomography reveals the presence of voids inside the Ta core, differently from what it was observed in the previous HiRadMat experiment (HRMT-27), in which the Ta was subjected to only a few high intensity pulses. Following the guidelines drawn by this and previous experiments, the current configuration of the new AD-Target design is presented, including its pressurized air-cooled Ti-6Al-4V envelope.

In addition, the PROTAD-HiRadMat experiment -foreseen in 2018- is introduced. This experiment will aim at testing six prototypes of such new design, containing different core geometries and materials configurations, as a last step for its final validation before installation in the area in 2020.

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