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Update on MOMENT target station studies

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The muon decay medium-baseline facility (MOMENT) is a high intensity neutrino beam proposed in China, aiming to measure leptonic CP violation. The primary proton beam has 15 MW of power provided from an ADS type of linac, which poses a radiation challenge to a capture system that consists of an adiabatic superconductive solenoid from 14 T to 3 T, and a high power liquid or fluidized target located inside the main capture coil in order to maximize the pions capture and reduce their transverse momentum. Though the initial baseline is the liquid Hg-jet, a novel fluidized waterfall-like granular target is also being studied. In this paper, we present updated studies for the waterfall granular target concerning simulations done with Discrete Element Method and particle physics Monte Carlo analyses. Our aim is to calculate the optimal physical parameters of the waterfall in order to comply with the physics (captured meson yields) requirements of MOMENT, to remove the heat efficiently, and finally to compare the radiation damage caused on the shields of the solenoid with the case of liquid Hg-jet that is severe.

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