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Thermal integrity test to muon production target by the induction heating system

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We report progress of which examines the thermal stability of the muon production target up to high temperature regime. We employed the high-frequency induction heating system as an indirect heater to target material, graphite, used with various purposes such as kitchenware, small blacksmiths. Prior to applying muon production target, we tested simple disc graphite with small chamber and RF feedthrough made by stainless steel, heat was delivered well to graphite, but metal RF feedthrough is bad for high temperature due to heating-up. We designed the flange for RF coil and supporters made by acetal (polyoxymethylene, POM). Tested with small chamber again, it worked under high vacuum condition (10^{-7} torr) and high temperature with full power loaded, but still plastic components are damaged by high temperature due to close to heating source. The thermal test is undertaken systematically at muon production chamber, combined with the engineering simulations, Ansys Mechanical/Maxwell simultaneously. This may be significant method to test various target as a thermal aspect without beam irradiation.

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