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Thu-Mo-Po4.07-02 [47]: Transverse field measurements in a bulk superconducting Magnetic Shell for a CLAS12 Target at Jefferson Lab

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Prototype tests are underway to study the feasibility of using a bulk magnetic system to maintain a transversely polarized target within the longitudinal solenoid of the CLAS12 detector, during an experiment to measure transverse spin effects in semi-inclusive deep inelastic scattering (SIDIS) at 11 GeV. The experiment has been approved with the highest priority rating at Jefferson Lab. The main CLAS12 detector solenoid would be operated with a maximum magnetic induction of 2 T. A bulk MgB₂ cylinder cooled in liquid helium is proposed both to shield this longitudinal field as well as to provide a transverse field induction up to 1.2 T to maintain the orientation of a solid hydrogen deuteride (HDice) polarized target. A test setup to measure the transverse magnetization of a MgB₂ bulk cylinder cooled by a coldhead has been developed. Transverse field measurements have been performed over a wide range of temperatures in two configurations, cooling past the critical point in the presence of an external field to trap a transverse field within the MgB₂, and shielding an external field that is applied after cooling. Results of these studies will be discussed.

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