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A Compact Magnetic Cloaking Device for Future Collider Experiments[1] BENJAMIN COE, KLAUS DEHMELT, ABHAY DESHPANDE, NILS FEEGE, Stony Brook University — Accelerator-based nuclear physics experiments need detectors capable of measuring momenta of charged particles in the very far forward direction from the interaction point. This requires a uniform magnetic field close to and perpendicular to the collider's beam pipe. If there were a magnetic field inside the beam pipe, however, it would displace and depolarize the (charged, polarized) colliding beams. It has been demonstrated, although on a small scale, that a magnetic cloaking device combining a superconducting layer and a ferromagnetic layer can maintain a uniform magnetic field outside while creating a field-free region within. We present the design of a device based on the idea, which meets the size and magnetic field shielding requirements for a detector for the Electron Ion Collider (EIC). We report on the progress towards building a functional prototype.

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