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A Magnetic Field Cloak For Charged Particle Beams ROURKE SEKELSKY, KYLE CAPOBIANCO-HOGAN, State Univ of NY- Stony Brook, RAPHAEL CERVANTES, State Univ of NY- Stony Brook, University of Washington, THOMAS KRAHULIK, State Univ of NY- Stony Brook, University of Virginia, JOSHUA LABOUNTY, State Univ of NY- Stony Brook, University of Washington, ALEXANDER ADHYATMAN, GORDON ARROWSMITH-KRON, State Univ of NY- Stony Brook, BENJAMIN COE, State Univ of NY- Stony Brook, Brookhaven National Laboratory, KLAUS DEHMELT, ABHAY DESHPANDE, NILS FEEGE, THOMAS HEMMICK, SEAN JEFFAS, TIFFANY LABYER, SHAMERAN MAHMUD, ABMAEL OLIVEIRA, AMIEL QUADRI, KARTIK SHARMA, State Univ of NY- Stony Brook, ABRAHAM TISHELMAN-CHARNY, State Univ of NY- Stony Brook, Northeastern University, SUNY STONY BROOK TEAM — The current design for a proposed Electron Ion Collider (EIC) forsees collisions between hadron and electron beams with a momentum ratio of about 12:1, resulting in a majority of particles produced in the hadron-going region. We aim to analyze these particles' momenta using magnetic fields perpendicular to their trajectories, but as their trajectory nears the beam line such fields would interfere with the incoming particle beams. Here, we demonstrate the potential of a magnetic field cloaking device to passively create a field-free tunnel for the beams while minimizing distortions of the applied external field. Such a magnetic field cloak has been fabricated and experimentally shown to shield more than 99% of the transverse field at 450 mT.

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