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Towards a New Platform for Magnetized HED Physics¹ PHILIP BRADFORD, LUCA ANTONELLI, MATTHEW KHAN, CHRISTOPHER RIDGERS, NIGEL WOOLSEY, University of York, NICOLA BOOTH, ROBERT SCOTT, KEVIN GLIZE, STFC Rutherford Appleton Laboratory, JOHN MOODY, BRADLEY POLLOCK, Lawrence Livermore National Laboratory, JOAO JORGE SANTOS, MICHAEL EHRET, University of Bordeaux, CNRS, CEA, CELIA, UNI-VERSITY OF YORK TEAM, STFC RUTHERFORD APPLETON LABORA-TORY COLLABORATION, LLNL COLLABORATION, UNIVERSITY OF BOR-DEAUX, CELIA COLLABORATION — A developing application of laser-driven currents is in generating magnetic fields of picosecond-nanosecond duration with magnitudes up to $\tilde{}$ 600T. Single loop and helical coil targets can direct the discharge current along wires to generate spatially-uniform, quasi-static magnetic fields on the millimetre scale. Here, we report on simultaneous proton imaging measurements across both axes of a single loop coil ranging from 1 to 5mm in diameter. Comparison with proton tracking and magnetic models show that fields measured via proton deflectometry are the result of kiloampere currents in the coil and electrostatic charges on the coil surface. We demonstrate how magnetic fields can then be used to engineer states of highly-magnetized matter by studying the dynamics of an exploding foil.

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