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Options for a next-generation spheromak physics experiment
E.B. HOOPER, Lawrence Livermore National Lab, B.I. COHEN, D.N. HILL, H.S. MCLEAN, C.A. ROMERO-TALAMÁS, R.D. WOOD — SSPX experiments and resistive MHD modeling suggest options for a next-generation experiment. Magnetic fluctuations are now <1% when the q-profile does not cross low-order rational surfaces in the spheromak core, yielding good energy confinement.[1] Plasma current and magnetic field decay slowly; initial experiments suggest that the they can be rebuilt periodically by high current pulses.[2] Modeling predicts that flux amplification, typically 2-3 in SSPX, can be increased to >50 by actively reducing the bias ("ABR") after spheromak formation, reducing edge ohmic losses proportionally. ABR is also predicted to improve stability and energy confinement. Neutral-beam experiments planned for SSPX[3] may provide a path to hotter plasmas. Next-generation spheromak geometries and scenarios building on these results are described to improve plasma parameters, explore additional stability control, and examine other physics issues. Work supported by U.S. DOE under Contract No. W-7405-ENG-48 at UC LLNL. [1]H. S. McLean, et al., Phys. Plasmas **13**, 056105 (2006). [2]S. Woodruff, et al., Phys. Rev. Letters **93**, 205002 (2004). [3]D..N. Hill, et al., this meeting.

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