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ArCS: A Magnetized LArTPC in a Test Beam

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Over the past few decades, Liquid Argon Time Projection Chambers (LArTPCs) have emerged as a central technology for rare-event detection, due to their calorimetric and imaging capabilities. Adding a magnetic field to LArTPCs would enable charge identification and momentum measurements via curvature. For neutrino experiments, this is crucial for wrong-sign neutrino rejection, electron/positron and electron/photon discrimination, and improved momentum reconstruction. The ArCS (Argon detector with Charge Separation) experiment at Fermilab's Test Beam Facility will place a 47×40×90 cm^3 LArTPC inside a 0.7 T magnet to: (i) establish charge sign discrimination for electrons and positrons, (ii) reconstruct particle momenta via curvature, and (iii) determine the minimal magnetic field needed for these measurements. This poster will present the project status, with updates on installation and simulations of expected performance.

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