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Ion collection by a sphere in a weakly magnetized plasma L. PATACCHINI, I.H. HUTCHINSON, MIT — Ion collection by a sphere in a collisionless flowing magnetoplasma is studied using the kinetic code SCEPTIC[1]. The key features of this 2d3v electrostatic PIC code are a spherical geometry accurately resolving the sheath at the collector's edge, and a Boltzmann treatment of the electrons. We concentrate on the transition between unmagnetized and weakly magnetized regimes: ion thermal Larmor radius $\rho_i > r_p$ (sphere radius). Two different Debye length (λ_D) regimes will be covered, giving the most relevant effects of the magnetic field in each regime. In the case $\lambda_D \ll r_p$, relevant to mach-probe physics, as the magnetic field increases the angular collection distribution changes particularly strongly on the downstream side. The flow and the magnetic field effect being correlated, we will deduce to what extent previous calibrations based on their independence are still valid. In the long Debye length case, $\lambda_D \geq r_p$, most relevant to dust in plasmas, one interesting effect of the magnetic field is to cancel the flux reversal caused by ion focusing downstream of the plasma flow. [1] I.H. Hutchinson **PPCF 45** (2003) 1477.

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