Towards a Full Braginskii Formulation in HYDRA[1] JOSEPH KON-ING, LLNL — The magnetic field package in the ICF radiation transport simulation code HYDRA currently contains a resistive MHD solver and includes the dielectric pressure source term, anisotropic electron thermal conduction and magnetic field effects on alpha charged particle transport. This package has been improved with the addition of Nernst and Hall terms implemented using a discrete differential forms method. The Nernst magnetic term includes a limiting method for any large thermal or magnetic gradients. The Nernst thermal term results in a non-symmetric matrix solved using GMRES. The Hall term is discretized using methods based on constrained transport magnetic advection. All of the terms utilize discrete differential forms methods to maintain zero magnetic divergence exactly while properly treating the appropriate continuity of all vector field terms.

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