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P1.1092 Full exploitation of the HYMAGYC code for a shaped cross section scenario

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HYMAGYC [1] is a HYbrid MAgnetohydrodynamycs GYrokinetic Code suitable to study the interaction between energetic particles (EPs) and Alfvénic modes. Thermal plasma is described as a single fluid by fully resistive linear MHD equations, while EPs are described by nonlinear gyrokinetic Vlasov equations [2]. In this work all the code capabilities have been fully exploited: a realistic shaped cross section AUG model scenario [3], finite magnetic compression, Finite Larmor Radius (FLR) effects. The proposed model scenario has been analyzed by CHEASE in order to compute the equilibrium quantities required by HYMAGYC. Running first the MHD linear stability eigenvalue code MARS, the shear Alfvén continua have been identified for low toroidal mode numbers (n=1,2,3). Then, a Maxwellian energetic particle population of deuterium is introduced and unstable modes appear. Frequencies and growth rates are reported for different simulation parameters. Finally the FLR and magnetic compression effects are retained and analyzed, showing a slight stabilazing effect on unstable modes. Note that CHEASE and MARS are already fully compliant with IMAS/EU-IM frameworks, while HYMAGYC is currently updating to the most up-to-date framework versions.

References
[1] G. Fogaccia, G. Vlad, S. Briguglio, Nucl. Fusion 56 (2016) 112004
[2] Brizard A.J. and Hahm T.S. 2007 Rev. Mod. Phys. 79 421-68
[3] (Ph.Lauber et al., NLED-AUG reference case, http://www2.ipp.mpg.de/~pwl/NLED_AUG/data.html)

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