

Geodesic acoustic modes in tokamak plasmas

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Abstract

Starting from the Braginskii equations a complete set of nonlinear equations for the geodesic acoustic modes (GAM) has been derived which includes collisionality, plasma beta and external sources of particle, momentum and heat. Local linear analysis shows that the GAM frequency increases with collisionality and decreases with beta. Radial profiles of GAM frequency for Tore Supra shots [Experimental analysis will be presented by A Storelli] are compared with that of gyrokinetic and our fluid calculations. Experimental GAM frequency intersects with our calculations for ion sound radius (ρ_s) normalized radial wave number $k_r \rho_s \in (0.5, 1.5)$. Nonlinear modulational instability analysis to estimate k_r is in progress and will be presented in the meeting. Role of turbulent particle, heat and momentum fluxes and external particle, heat and momentum sources in GAM excitation will be discussed.

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