

Analytical Solutions for Geodesic Acoustic Eigenmodes in Tokamak Plasmas

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Abstract : The analytical solutions for geodesic acoustic eigenmodes in tokamak plasmas with circular concentric magnetic surfaces are found. In the frame of ideal magnetohydrodynamics the dispersion relation taking into account the toroidal coupling between electrostatic perturbations and electromagnetic perturbations with poloidal mode number $|m| = 2$ is derived. In the absence of such a coupling the dispersion relation gives the standard continuous spectrum of geodesic acoustic modes. The analysis of the existence of global eigenmodes for plasma equilibria with both off-axis and on-axis maximum of the local geodesic acoustic frequency is performed.

Keywords : tokamak, MHD, geodesic acoustic mode, eigenmode

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