Singl/multiple Global Geodesic Acoustic Modes[1] TIANCHUN ZHOU, Harbin Institute of Technology — Both experiments and simulations reveal that there exist single/multiple global geodesic acoustic modes that have constant frequencies over radial extension in the tokamak plasmas. In the framework of ideal MHD, the global structure of the mode emerges as the requirement the momenta associated with the second poloidal harmonics inside the coupling between the magnetic (geodesic) curvature and the leading pressure perturbations be balanced by the Alfven perturbations, which involve the the plasma displacements of higher order: the normal displacement and the second poloidal harmonic component of the geodesic displacement. The analytical and numerical solutions to the eigen-mode equation will be presented for typical q and temperature profiles. This theory is extended to the case where single local GAM splits into multiple branches as a result of plasma rotations. The rotation also induces richer poloidal harmonic structures and it eventually leads to two coupled ODEs of 2nd order. Multiple global GAMs occur naturally as the solutions of this eigen-value problem.

Tianchun Zhou
Harbin Institute of Technology

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