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**Global Geodesic Acoustic Modes in Tokamak Plasmas** EKATERINA SOROKINA, VIKTOR ILGISONIS, VLADIMIR LAKHIN, RRC Kurchatov Institute, ANDREY SMOLYAKOV, University of Saskatchewan, IVAN KHALZOV, University of Wisconsin-Madison — Global Geodesic Acoustic Modes (GGAM) in Tokamak Plasmas are investigated in the framework of reduced ideal MHD. The axisymmetric eigenvalue problem for perturbed pressure and electrostatic potential is formulated as a recurrent set of equations for poloidal Fourier harmonics. For uniform safety factor q and temperature profile with a maximum at radius $r = r_0 \neq 0$ the analytical solution of this eigenvalue problem is obtained for a truncated set of equations taking into account the $m = 0$ and $m = 2$ poloidal harmonics of potential and the $m = 1$ harmonic of pressure. This solution exists in wide range of $\beta q^2$. It is shown both analytically and numerically that the higher harmonics of pressure ($m = 3$) and electrostatic potential ($m = 4$) reduce the range of the parameters, in which GGAM exist, due to the resonance with continuum spectrum. The domain of GGAM existence in the ($\beta q^2$, $r_0$)-plane is represented. Higher poloidal harmonics ($m > 4$) are shown to weakly affect the GAM spectrum and do not lead to the appearance of other global eigenmodes. The work is supported in part by grant RBRF 10-02-01302 and by Ministry of Education and Science of the RF, contract 1.5-508-008-045.

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