

Geodesic Acoustic Mode Spectroscopy

S.-I. Itoh¹, K. Itoh², M. Sasaki³, A. Fujisawa², M. Yagi¹, Y. Nagashima¹

¹Research Institute for Applied Mechanics, Kyushu University, Kasuga 816-8580,
Japan

²National Institute for Fusion Science, Toki 509-5292, Japan

³Graduate School of Science, The University of Tokyo, Tokyo 113-0033, Japan

A new kind of plasma diagnostics, geodesic acoustic mode (GAM) spectroscopy, is proposed. Radial eigenmodes of GAMs with discrete eigenfrequencies in toroidal plasmas are analyzed. The eigenmode has the wavelength of the order of $\rho_i^{2/3} L_T^{1/3}$ (ρ_i : ion gyroradius, L_T : temperature gradient scale length), and is evanescent where the local GAM frequency is higher than the eigenfrequency [1,2]. Therefore, the radial position of the highest peak of eigenmode provides a method to measure the local ion sound velocity. The novel method to measure the ion composition is given, combined with density and temperatures.

[1] K. Itoh, et al.: Plasma Fusion Res. **1** (2006) 31

[2] M. Sasaki, et al., ‘Geodesic acoustic mode in toroidal plasmas’, presented at 11th International workshop on plasma edge theory (2007, Takayama) paper P2-18

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