The interaction between geodesic acoustic mode (GAM) and small-scale drift-wave turbulence has been an important area of research for anomalous transport of energy and particles in toroidal plasmas for a long time. In particular, investigation of GAMs in the FT-2 tokamak [1, 2] revealed several specific features characterising flows. The anti-correlation of GAMs amplitude and the electron thermal diffusivity $\chi_e$ behavior both spatial and temporal provided an argument in favor of their role in transport phenomena. A systematically larger level of GAMs amplitude in deuterium (D) regime in comparison with hydrogen (H) accompanied by smaller level of the diffusivity $\chi_e$ became the striking example of the isotope effect.

In this paper the interaction of GAMs with turbulence in H and D plasmas is studied by microwave upper hybrid resonance (UHR) Doppler back scattering (BS) and reflectometry diagnostics. The special attention is given to GAM interaction with turbulence of different spatial scales, particularly with small-scale fluctuations possessing $k_r\rho_S > 2$ characterized by the correlative UHR BS and with larger scale turbulence measured with $O$-mode reflectometer. The modulation of the large-scale turbulence level at the GAM frequency is investigated by cross-method utilizing both approaches. The evolution of fluctuations is measured by reflectometer whereas the poloidal velocity oscillations are reconstructed from the UHR Doppler BS measurements. The influence of GAMs intermittency on small-scale wave number spectra formation and turbulence level for both scales is studied in the work. The interrelation between electron thermal diffusivity, estimated by ASTRA modeling based on the experimentally measured profiles, and GAMs level on the one hand and turbulence level on the other is analyzed finally.

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