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Experimental evaluation of complexity of ions interacted with high-frequency waves in a mirror field[1] RYUYA IKEZOE, TAKUMI ONCHI, Kyushu University, SEOWON JANG, MAKOTO ICHIMURA, MAFUMI HIRATA, University of Tsukuba — A hot plasma confined in a mirror magnetic field is used for the study of complexity of ion dynamics in a magnetized plasma. The main concentration of this study is on discrimination of the complexity caused by interaction with waves of frequencies up to ion cyclotron range of frequencies (ICRF). The data was taken from a hot collisionless plasma with good separated measurement of ions. Since ions with enough energy seldomly meet collisions with plasma, dynamics of such ions would have better sign of interacted waves. In addition, open-field system like a mirror field offers better environment for ion measurement than closed system. Our experimental observation is as follows. When ion pressure perpendicular to a field line was significantly increased by the application of ICRF wave, an unstable Alfven wave called as AIC wave appeared to relax the excessive ion pressure anisotropy. At the same time, high flux of high–energy ions was measured at the machine end by several ion detectors, indicating pitch-angle scattering of trapped ions owing to interactions with the waves. The complexity of ion dynamics in this case was dominated by interactions with the externally applied ICRF wave and the AIC waves. Jensen-Shannon complexity and normalized permutation entropy showed some unique change against varied plasma parameters and different ion–energy band. The observed complexity will be reported in relation to interaction with the waves.

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