**Observation of the Geodesic Acoustic Modes (GAM) density fluctuations in H-mode on EAST**

H.Lian1,2, K.N.Geng1,3,4,\*, T.Zhang1, H.Q. Liu1, C.Zhou5, A.D. Liu5, S.X. Wang1, Y.X. Jie1, W.X.Ding2,5, Y.Q.Chu1,5, Q.Zhou6, C.L.Lan7 and EAST team

*1 Institute of Plasma Physics, Chinese Academy of Science, Hefei, Anhui 230031, China*

*2University of California, Los Angeles, California 90095, USA*

*3Advanced Energy Research Center, Shenzhen University, Shenzhen 518060, China*

*4 College of Physics and Optoelectronic Engineering, Shenzhen University, Shenzhen 518060, China*

*5University of Science and Technology of China, Hefei, Anhui 230026, China*

*6School of Science, Anhui Agricultural University, Hefei, Anhui 230036, China*

*7School of Nuclear Science and Technology, Lanzhou University, Lanzhou 730000, China*

A geodesic acoustic mode (GAM) is observed in H-mode plasma on EAST tokamak. With the POlarimetry-INTerferometry (POINT) system on EAST, the density fluctuation arising from the GAM is obtained. Electron density fluctuation is measured to have an m=1 structure where m is poloidal number. Density fluctuation amplitude in the edge measurement chords is higher than central chords as expected from GAM. The mode frequency increases from 15kHz in L-mode plasma to 25kHz in H-mode. Turbulence fluctuations decrease in H-mode but GAM is still sustainable during entire H-mode discharge phase. For the first time on EAST, the GAM density fluctuation both in L and H-mode plasma with POINT measurement is reported in this paper. GAM fluctuation frequency increases from 15kHz to 25kHz in L-mode and keeps at around 25kHz in H-mode till the end of discharge. The poloidal number m is obtained from the correlation between  and  , it is supposed to be 1 as their phase difference is p , and it keeps m=1 both in L and H-mode plasmas, it is further confirmed by the correlation between magnetic signal and POINT 11 chords. The GAM density fluctuation of 11 measurement chords are also demonstrated. Amplitude of edge chords are high while the chords in middle are low, which is consistent with the theory expectation. The fluctuation amplitude decreases significantly after the L-H transition, which is because the confinement suppresses the turbulence. However, the understanding of GAM in H-mode is still not fully clear, which needs more study in the future. The driving force of GAM in H-mode is under experimental investigation.