Contribution ID: **671** Type: **Poster**

Effect of externally applied radial electric field (biased-electrode) on Geodesic Acoustic Modes in SINP tokamak

Wednesday 24 October 2018 14:00 (20 minutes)

Geodesic Acoustic modes (GAMs), believed to play an important role in L to H transition in tokamaks, are the high frequency branch of the zonal flows and are characterized by toroidally and poloidally symmetric in potential ϕ (n=0, m=0) and toroidally symmetric but poloidally asymmetric in density perturbation (n =0, m=1). The coherent modes in the spectral analysis of floating potential fluctuations measured in the edge plasma region of Saha Institute for Nuclear Physics tokamak (SINP-tokamak) using Langmuir probes are recently identified as geodesic acoustic modes (GAMs) having different characteristics over a wide range of qedge. The mode is radially localised in the edge plasma and have finite radial propagation. These coherent modes are simultaneously observed in density and radial electric field fluctuation spectra as well. The observed mode conclusively exhibits all the characteristics of the continuum GAM in the discharges having qedge values from 3.0 to 6.0 in normal tokamak regime. In this range of qedge, the poloidal and toroidal components of the wave-vector clearly show the $n \sim 0$, $m \sim 0$ structure of the mode and the frequency of the mode, and its variation with qedge matches quite well with that predicted by theory. In the intermediate range of qedge = 2.5 - 3, the mode exhibits the eigenmode GAM like characteristics as the frequency of modes does not depend on the local plasma parameters; however, the structures remained of $n \sim 0$, $m \sim 0$ type. Decreasing qedge below 2.5, the mode characteristics change significantly with the poloidal wave number becoming finite. Further, these modes are observed to be affected by the externally applied radial electric fields. The radial electric fields are induced by inserting a biased electrode inside the last closed flux surface of SINP-tokomak plasma. Interestingly, it is observed that the radial electric field affect the frequency and amplitude of GAM modes. Frequency range of the typical Eigen-mode GAM widens, owing to increase in temperature of the plasma due to improved confinement. Amplitude of the mode is observed to increase with bias potential.

Country or International Organization

India

Paper Number

EX/P4-11

Author: Mr LACHHVANI, Lavkesh (Institute for Plasma Research)

Co-authors: Dr GHOSH, Joydeep (Institute for Plasma Research); Dr CHAKRABARTY, Nikhil (Saha Institute for Nuclear Physics); Dr CHATTOPADHYAY, Prabal (Institute for Plasma Research); Dr PAL, Rabindranath (Saha Institute for Nuclear Physics); Mr MACWAN, Tanmay (Institute for Plasma Research)

Presenter: Mr LACHHVANI, Lavkesh (Institute for Plasma Research)

Session Classification: P4 Posters