2nd Asia Pacific Conference on Plasma Physics, 12-17,11.2018, Kanazawa, Japan

AAPPS-DPP2018 Invited Nomination form (Jan. 10-Feb 28)

1. **Session: B**
2. **Type : Invited**
3. **Speaker: Dr. Bornali Sarma**
4. **Affiliation : VIT, Chennai**
5. **Rationale: The candidate has proposed to study the sheath induced instability around plasma bubbles in presence of magnetic field under various experimental conditions. Finding out the nonlinear behavior of such configuration using various techniques and numerical model is the novelty of this work. So far, very less amount of research work is seen to correlate the instability in plasma and the its' nonlinear behavior quantitatively & qualitatively too. Such findings are going to be helpful in understanding the formation of plasma bubbles and its associated instabilities in F-layer of ionospheric space region.**
6. **Short abstract for 2nd Asia-Pacific Conference on Plasma Physics**

Abstract:

The typical phenomena of formation of sheath and their associated instabilities in presence of plasma bubble have been investigated in filamentary discharge magnetized plasma. Spherical mesh grid of 80% optical transparency has been negatively biased and introduced in the plasma for creating plasma bubble. Diagnostics tool viz., electrical Langmuir probe and hot Emissive probe have been extensively used to understand the fluctuation behavior as well as the potential structure inside the plasma bubble[1, 2]. It has been observed that the presence of localized density around the bubble increases in presence of external magnetic field strength. The effect of such localized density on the plasma floating potential fluctuation dynamics is studied. It has been seen that there is a formation of electron rich region showing a potential dip at the center, inside plasma bubble in presence of magnetic field. Increasing the magnetic field shows the dynamical transition from period doubling bifurcation to chaos. Low frequency sheath induced instability has been observed in each and every position across the grid. The mechanisms of the low frequency instabilities along with the transition to chaos have been qualitatively and quantitatively explained. Nonlinear techniques such as Fast Fourier Transform, Phase Space Plot, Recurrence Plot, Recurrence quantification analysis have been used to explore the dynamics of the system appearing in the plasma fluctuations [3]. Furthermore, theoretical and numerical analysis has been carried out to validate the potential structure around the plasma bubble; its influence on the fluctuation dynamics etc.

List of related published papers:

[1]R. L. Stenzel and J. M. Urrutia 2012 *Phys Plasmas* 19, 082105
[2] R. L. Stenzel and J. M. Urrutia 2012 *Phys Plasmas* 19, 082106
[3] Vramori Mitra, Hari Prakash.N, Infant Solomon, Mariammal Megalingam, A. N. Sekar Iyengar, Norbert Marwan, Juergen Kurths, Arun Sarma and Bornali Sarma 2017 *Phys Plasmas* 24, 022307