

3<sup>rd</sup> Asia-Pacific Conference on Plasma Physics, 4-8,11.2019, Hefei, China

## Excitation and Evolution of Ion Waves in ECR Plasma

Bo-long Zhu, Kai-yang Yi, K. Yang, W. Ke, J. X. Ma, X. D. Zhu

School of Physical Sciences, University of Science and Technology of China, Hefei, 230026, China

e-mail: [blzhu@mail.ustc.edu.cn](mailto:blzhu@mail.ustc.edu.cn), [xdzhu@ustc.edu.cn](mailto:xdzhu@ustc.edu.cn)

In the microwave ECR plasma system with a diverging magnetic field structure, the excitation and evolution of ion waves in ECR plasma have been investigated. The Langmuir probe measurements demonstrates that the plasma potential ( $V_p$ ), electron temperature ( $T_e$ ) and electron density ( $N_e$ ) decrease from the source chamber to the target chamber, while the ion distribution function is broad and multimodal obtained by retarding field energy analyzer. Such a system can be approximately considered as an ion -beam-background plasma system. The ion waves were excited by the grid excitation mode, and the wave velocities were measured by the time of flight method while the rise time of the applied ramp signal varies from  $0.32 \mu\text{s}$  to  $6.2 \mu\text{s}$ . By using a simple ion-beam plasma mode, the ion wave velocities were calculated from the plasma parameters, which is in qualitatively agreement with the result obtained by the time of flight method.

### References

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Fig. 1. The variations of the received wave signals with respect to the rise time  $\tau$  of the ramp signal in the case  $V_{pp} = 20 \text{ V}$  and at  $x = 16 \text{ cm}$ . The excitation grid is at  $x = 12 \text{ cm}$ . The signals with the labels F, S and I were identified as fast and slow ion-beam modes, and ion acoustic mode, respectively.

