P-AMP5: Ion beam instability in the presence of a fireball

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A low frequency instability is excited in an ion beam plasma system in presence of a localized discharge, a so-called fireball. The experiment has been performed in the Innsbruck double plasma device of 90 cm length and 45 cm diameter with a mesh grid separating the two chambers. The optical transparency of the grid is almost 60\%. An ion rich sheath is created across the grid by biasing the grid negatively with respect to ground. A fireball is formed at one end of the target chamber by an additional positively biased plane circular electrode. An instability is observed, the frequency of which varies when there is an asymmetry between the plasma densities in the target and source chamber. In addition the frequency depends on the grid biasing voltage and the source anode biasing voltage. Moreover, the character of the instability differs completely in presence of the fireball. Experiments have been performed by producing fireballs at different gas pressures and different ratios of the target plasma to the source plasma densities. It has been observed that the instability produced by the grid biasing voltage is mainly local in nature, i.e., near the presheath region, while it is global in nature in presence of a fireball under our device configuration.

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