

MYSTERIOUS MODES OF ULTRACOLD PLASMAS

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The expansion rate of ultracold plasmas has been measured by applying an RF electric field to the plasma, and observing a pulse of released electrons [Kulin, *et al.*, PRL **85**, 318 (2000)].

The simple interpretation was that when the average plasma density was such that the plasma frequency associated with that density matched the RF frequency, energy was pumped in and electrons boiled off, which allowed the mapping of density vs. time. We have been examining this system in more detail, and under many conditions observe multiple resonances (up to 6) during the plasma expansion. These extra resonances were thought to possibly be signatures of ion acoustic waves, but I will discuss why this is unlikely. I will discuss possible interpretation(s) of these modes, and their dependence on plasma parameters, including temperature, density, and density profile.

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