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Session GP1 - Poster Session IV.

POSTER session, Tuesday morning, October 24

Exhibit Hall AB, Qu\{e}bec City Convention Centre

[GP1.010] Landau Damping in Weakly Collisional Plasmas and Galaxies

C. S. Ng, A. Bhattacharjee (Department of Physics and Astronomy, The University of Iowa.)

Recently we have developed a new method to calculate the eigenfrequencies and eigenfunctions of plasma oscillations in a weakly collisional plasma. (C. S. Ng, A. Bhattacharjee, and F. Skiff, Phys. Rev. Lett. 83) 1974 (1999). It was shown that the Case-Van Kampen continuous spectrum is eliminated in the limit of zero collision frequency and replaced by a discrete spectrum. The Landau-damped solutions are recovered in this limit, but as true eigenmodes of the weakly collisional system. These new results on Landau damping in a weakly collisional plasma also call for some revisions in the textbook description of kinetic damping of short-wavelength Jeans instabilities in galactic dynamics. For a weakly collisional galaxy, in the regime of long wavelengths, we recover the well-known result that long-wavelength instabilities (larger than the Jeans length) are unstable. In the regime of short wavelengths, and in contrast with the predictions of the collisionless Jeans theory, we find true kinetic eigenmodes.

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