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**Kinetic stability of Chapman-Enskog plasmas** ARCHIE BOTT, Department of Physics, University of Oxford, STEVEN COWLEY, Princeton Plasma Physics Laboratory, ALEXANDER SCHEKOCHIHIN, Department of Physics, University of Oxford — In this talk we will discuss the kinetic stability of classical, collisional plasmas. Fluid equations are typically used to describe such plasmas, since their distribution functions are close to being Maxwellian. The small deviations from the Maxwellian distribution are calculated via the Chapman-Enskog (CE) expansion, and determine macroscopic momentum and heat fluxes in the plasma. Such a calculation is only valid if the underlying CE distribution function is stable at collisionless scales. We will demonstrate that at sufficiently high plasma $\beta$, the CE distribution function can be subject to numerous microinstabilities across a wide range of scales, the most significant of which we shall characterize. Of specific note is the discovery of the previously uncharacterized 'whisper-wave instability', whose growth rate in certain parameter regimes is large compared to other instabilities. Our approach enables us to construct the kinetic stability maps of classical, two-species collisional plasma in terms of the mean free path, the electron skin depth and the plasma $\beta$. Our work highlights that collisional plasmas can be kinetically unstable; in this situation, the determination of transport coefficients with the standard CE expansion is not necessarily valid.

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