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Two-dimensional Bernstein-Greene-Kruskal Modes in a Magnetized Plasma: Exact Solutions and Particle-in-Cell Simulations¹ C.S. NG, S.J. SOUNDARARAJAN, Geophysical Institute, University of Alaska Fairbanks — We present here a new analysis in constructing two-dimensional Bernstein-Greene-Kruskal (BGK) modes in a magnetized plasma with finite magnetic field strength. The original method of constructing these modes [Ng, Bhattacharjee, and Skiff, Phys. Plasmas 13, 055903 (2006)], which satisfy the exact electromagnetic Vlasov-Poisson-Ampere system, requires solving them iteratively. An interesting property of these modes is that they can have a strong magnetic component for large electron thermal velocity. Exact solutions are presented using a new method that solves more directly without this iterative step for any electron thermal velocity. We will also present preliminary results on simulating these modes using Particle-in-Cell (PIC) simulations, which is important in studying the stability of these modes.

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