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**Session BP1 - Poster Session I.**

*POSTER session, Monday morning, November 15  
Room Exhibit Hall A, SCC*

**[BP1.042] Bernstein-Greene-Kruskal Solution in a Three Dimensional Unmagnetized Plasma**

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It is well known that a Bernstein-Greene-Kruskal (BGK) solution can be easily constructed as an exact nonlinear solution of the one dimensional Vlasov equation for an unmagnetized plasma. There have been questions about the existence of such solutions for a three dimensional (3D) unmagnetized plasma, although a solution for an infinitely strong magnetic field case can be constructed using the guiding center approximation. It is shown that a 3D solution depending only on energy does not exist. However, it is shown that a spherically symmetric solution can be constructed if it depends on energy as well as angular momentum. Typical solutions will be constructed numerically and, the form of such solutions will be analyzed. Possible extension to cases with cylindrical symmetry or finite magnetic guide field will be discussed. Applications of these results to laboratory and space plasmas will be presented.

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