

## The Beams and Applications Seminar Series

# First Steps Towards a New Generation of High-Order Particle-In-Cell Methods for General Kinetic Plasma Applications

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Brown University**

**Bldg. 401, Rm. B4100**

**Wednesday, November 1, 11:00 am**

**(Please Note Special Time and Place)**

Host: Yong-Chul Chae, ASD

*Abstract: .... We shall discuss the ongoing development of a high-order accurate PIC method on unstructured grids. The field solver is based on a Discontinuous Galerkin (DG) scheme for the time-domain Maxwell equations. This ensures geometric flexibility through a fully unstructured grid at arbitrary order of accuracy enabling efficient and accurate modeling of multiscale phenomena. The particle mover is flexible in terms of particle shapes and a level set approach is employed to implement elastic/inelastic interactions with boundaries. Divergence control is done either through a fully hyperbolic Lagrange multiplier technique or using a classical Boris projection scheme. We shall illustrate the performance of the two-dimensional and three-dimensional algorithm through a few examples, e.g., plasma waves, Landau damping, magnetrons etc. Both non-relativistic and fully relativistic cases shall be considered as well as some simple magnetron cases with more complex geometries.....*

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(kitching@aps.anl.gov, 630-252-6159) to arrange for a gate pass.