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UCLA Particle-in-Cell and Kinetic Simulation Software Center for Plasma Simulation

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Abstract content
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UCLA has recently established a Particle-in-Cell (PIC) and Kinetic Software Center (PICKSC) for plasma simulation. This center is in the process of providing a variety of open source software resources for the plasma physics community, ranging from codes running on laptops to codes designed to run on millions of cores on emerging computer architectures. The codes provided fall into a number of categories:
1. Skeleton codes (mini-apps). These are small bare bone applications that illustrate algorithms. We have codes that illustrate basic algorithms for beginning students to codes with 1, 2, and 3 levels of parallelization for supercomputer experts. Electrostatic, electromagnetic, and Darwin models are provided, in both Fortran and C, with some Python.
2. UPIC Framework. This provides a collection of tested components for designing new PIC codes, along with reference applications illustrating their use. It currently supports FFT based field solvers. The reference applications can be used for testing ideas and as a base for building new codes. Modest extensions of the reference applications are useful for some Ph.D. level research projects.
3. Educational codes. These codes are designed for teaching important plasma concepts, suitable for interactive classroom use. Both laptops and web based applications are planned.
4. Production codes. These are codes being used by a large number of people for research in many areas of plasma physics. These will include QuickPIC, UPIC-EMMA, OSHUN, and a version of OSIRIS. Some of these codes will heavily utilize the reference applications within UPIC. The goal is to lead a community effort in further developing them.

Design details and current status will be discussed. The center maintains a web site at: http://picksc.idre.ucla.edu/. Contributions to this web site from others are solicited.

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