Verification of Particle-in-Cell Codes for Low Temperature Plasma Physics[1] KEITH CARTWRIGHT, Sandia National Laboratories — A broad overview of verification procedures for computer simulation with an emphasis in low temperature plasma physics will be presented. To have a high degree of confidence in simulations one needs code verification, code validation, solution verification, and uncertainty quantification. Code verification is a set of test developed to uncover coding mistakes that affect the numerical solution. Code validation addresses the appropriateness of the model in reproducing experimental data. Solution verification is the estimation of the numerical errors that occur in every computer simulation including validation and verification. Uncertainty quantification is the characterization of the sensitivity of results to parameters and geometry used in the models. The verification of the simulation code is an important first step in increasing the credibility of the results from simulations. Methods for generating of good verification problem for low temperature plasma physics will be shown. This includes the use of analytic solutions as well as using the method of manufactured and nearby solutions. DC sheaths with both pure electrons and electron and ion sheaths is the verification problem that will be discussed in detail.

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