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**Numerical Simulation of the DC Discharge Using CFD-ACE+**  
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Huntsville, AL 35806, ESI R&D TEAM — A low pressure DC discharge is simulated using the CFD-ACE+. The electron kinetics is obtained from the kinetic module. The local and non-local approaches are used separately for solving the kinetic equation. The results are compared at different locations in the discharge. It is shown that although the local approximation gives a good description of the electron energy distribution function (EEDF) in the bulk plasma, it fails to give accurate information of the EEDF near the wall, which is highly non-Maxwellian. As a result, the non-local approach is more appropriate for the kinetic treatment of plasma electrons in a low pressure DC discharge. The ion number density and momentum are obtained from a fluid model. For comparison, the electron continuity equations are also included. Based on the simulation model, the species' density profile, the power balance and the influence of the electron-electron coulomb collisions on the EEDF and discharge physics are investigated. The simulation results are also compared with results from pure fluid model without kinetic description.

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