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Solution of Poisson's equation in electrostatic Particle-In-Cell simulations.[1] DANIEL KAHNFELD, RALF SCHNEIDER, Institute of Physics, Ernst-Moritz-Arndt University of Greifswald, Germany, KONSTANTIN MATYASH, Computing Center, Ernst-Moritz-Arndt University of Greifswald, Germany, KARL LÜSKOW, GUNNAR BANDELOW, Institute of Physics, Ernst-Moritz-Arndt University of Greifswald, Germany, OLEKSANDR KALENTEV, Biomedical NMR at Max Planck Institute for Biophysical Chemistry, Göttingen, Germany, JULIA DURAS, Department of Applied Mathematics, Physics and Humanities, Nürnberger Institute of Technologies, Germany, STEFAN KEMNITZ, Institute of Computer Science, University of Rostock, Germany — For spacecrafts the concept of ion thrusters presents a very efficient method of propulsion. Optimization of thrusters is imperative, but experimental access is difficult. Plasma simulations offer means to understand the plasma physics within an ion thruster and can aid the design of new thruster concepts. In order to achieve best simulation performances, code optimizations and parallelization strategies need to be investigated. In this work the role of different solution strategies for Poisson's equation in electrostatic Particle-in-Cell simulations of the HEMP-DM3a ion thruster was studied. The direct solution method of LU decomposition is compared to a stationary iterative method, the successive over-relaxation solver. Results and runtime of solvers were compared, and an outlook on further improvements and developments is presented.

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