

全粒子コードの高次精度化

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Implementation of higher-order schemes into full particle simulations

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Full particle simulations are widely used for studying various phenomena in plasma. Since a finite number of particles are used in discretized field grid cells, the Particle-In-Cell (PIC) method has large numerical noises. Also, the PIC method causes the numerical Cerenkov instability when the velocity of charged particles becomes close to the speed of light. In the present study, we use a new higher-order interpolation scheme for electromagnetic fields [Sokolov, 2011] to reduce numerical heating of charged particles. We are also trying to implement a higher-order Finite-Difference-Time-Domain (FDTD) method, in which the numerical dispersion relation of electromagnetic light mode waves is improved in comparison with conventional second-order method.