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Numerical finite particle effects and wave breaking limits[1] RYAN SANDBERG, ALEXANDER THOMAS, ROBERT KRASNY, University of Michigan — Seminal works of Dawson, Akhiezer and Polovin, and Coffey provide theoretical cold, relativistic, and warm wave breaking limits, respectively. There is renewed interest in understanding wave breaking limits to either achieve or avoid them, depending on the injection and acceleration mechanism. Numerical simulations are often used to investigate breaking limits. When particle methods are used, they commonly employ finite numerical particle size or, equivalently, a smoothed Green's function for the electric interaction. In this work we present studies of finite numerical particle effects on wave breaking limits. We discuss phase mixing times and breaking limits in relativistic and non relativistic cases when using finite sized numerical particles in simulation. We compare PIC models with the Dawson sheet model and other particle methods, using a 1d grid-free particle method employing a smoothed kernel.

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