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## **EZ: An Efficient, Charge Conserving Current Deposition Algorithm for Electromagnetic Particle-In-Cell Simulations**

*Thursday, 10 November 2022 14:30 (15 minutes)*

We present EZ, a novel Current Deposition algorithm for particle-in-cell simulations, which calculates the current density on the grid due to macro-particle motion within a time step by solving the electrodynamic continuity equation. Being a charge conserving hybridization of Esirkepov's method and ZigZag, we refer to it as "EZ" as shorthand for "Esirkepov meets ZigZag".

The talk will detail the new method and show that EZ achieves the same level of charge conservation as the commonly used method by Esirkepov, yet reaches higher performance for macro-particle assignment-functions up to third-order. These results are obtained from Simulations of a warm, relativistic plasma with PIconGPU.

In addition, guide lines for its implementation aiming at highest performance on GPUs are provided.

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