

## **How to Do Particle-in-Cell Simulations – Dawson’s Classical Algorithm vs. Qin’s Modern Algorithm**

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Particle-in-cell (PIC) methods and simulations are widely applied in plasma physics and other fields. To solve critical physical problems and make full use of high performance computer clusters, new marvelous PIC algorithms with longterm accuracy and stability should be designed. To achieve this goal, based on Dawson’s PIC schemes, the mathematical foundations of PIC methods are recently explored. Correspondingly, a series of Qin’s modern algorithms are constructed and practiced successfully.