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**Comparison of Semi-Lagrangian Algorithms for Solving Vlasov-type Equations** STEPHAN BRUNNER, TRACH-MINH TRAN, MAURA BRUNETTI, CRPP-EPFL — In view of pursuing CRPP's effort in carrying out gyrokinetic simulations using an Eulerian-type approach [M. Brunetti *et. al*, Comp. Phys. Comm. **163**, 1 (2004)], different alternative algorithms have been considered. The issue is to identify the most appropriate time-stepping scheme, both from a point of view of numerical accuracy and numerical efficiency. Our efforts have concentrated on two semi-Lagrangian approaches: The widely used cubic B-spline interpolation scheme, based on the original work of Cheng and Knorr [C. Z. Cheng and G. Knorr, J. Comp. Phys. **22**, 330 (1976)], as well as the Cubic Interpolation Propagation (CIP) scheme, based on cubic Hermite interpolation, which has only more recently been applied for solving Vlasov-type equations [T. Nakamura and T. Yabe, Comp. Phys. Comm. **120**, 122 (1999)]. The systematic comparison of these algorithms with respect to their basic spectral (diffusion/dispersion) properties, as well as their ability to avoid the overshoot (Gibbs) problem, is first presented. Results from solving a guiding-center model of the two-dimensional Kelvin-Helmholtz instability are then compared. This test problem enables to address some of the key technical issues also met with the more complex gyrokinetic-type equations.

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