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Progress Toward Simulations of Heavy-Ion Beams for Inertial Fusion Energy Based on a Darwin Model Field Solver*

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The Darwin model is an intermediate model between a purely electrostatic model and the full Maxwell equations [2], obtained by discarding the transverse part of the displacement current in Ampere's law. The model is appealing in some regimes applying to heavy ion beams. Nonetheless it has been neglected up to now, perhaps because of its difficult implementation in most plasma physics problems, linked to the instability of naive time differencing. However, the analyses performed in [3] and [4] tell us that there is a stable regime, and that the stability condition is $\omega_p/(ck) < 1$. This stability condition is in general fulfilled in our heavy ion beam problems, which should make our Darwin implementation a lot easier than for most previous plasma physics problems. Progress will be presented.

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