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Electromagnetic beam filamentation with collisions MASSIMILIANO FIORE, MICHAEL MARTI, RICARDO FONSECA, LUIS SILVA, GoLP/CFP, Instituto Superior Técnico, Lisbon, Portugal, CHUANG REN, University of Rochester, MICHAIL TZOUFRAS, WARREN MORI, UCLA — In recent years, the Weibel instability has received an increasing interest due to its potentially important role in Astrophysics (GRBs) and in other fields of Plasma Physics, such as Fast Ignition. In the standard fast ignitor scenario the collisionless filamentation (Weibel) instability of the forward laser driven MeV electrons and their return current can occur in the coronal region of the fuel pellet. As the collision frequency becomes non negligible in inner regions, the filamentation instability still occurs but with a significantly smaller growth rate and larger typical wavelengths, which can be comparable to the typical beam size, and whole beam instabilities arise. Using relativistic kinetic theory, we present a model to study the linear stage of the filamentation instability, including collisions through the BGK model. The dispersion relation is numerically solved. Simulations with OSIRIS 2.0 including binary collisions illustrate this regime of the filamentation instability.

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