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Radiation Spectral Synthesis during the Relativistic Filamentation Instability[1] J.T. FREDERIKSEN, T. HAUGBØLLE, NBIA, M.V. MEDVEDEV, KU & NBIA, Å. NORDLUND, NBIA — Radiation from high-energy density plasmas in astro observations and lab experiments can be used to diagnose complex field topologies and non-thermal particle distributions. Simulating spectral emission and spectral evolution numerically in various relativistic shock scenarios is then the only viable method to determine the detailed physical origin of the emitted spectra. We present synthetic radiation spectra obtained from the development of the filamentation (streaming) instability in a periodic box, which is relevant for collisionless shocks and laser plasma experiments. They were obtained using an *in situ* diagnostics collection method, based on detailed particle-in-cell modeling of collisionless plasmas. The synthetic spectra are compared with those predicted by a semi-analytical model for jitter radiation from the filamentation instability. The spectra exhibit dependence on the plasma composition, the viewing angle wrt the plasma anisotropy direction and are variable in time. The results also illustrate that considerable care should be taken when using lower-dimensional (2D) models of radiation emission to obtain information about magnetic turbulence on sub-Larmor scales.

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