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Filamentation instability in relativistic pair plasmas M. D'ANGELO, L. FEDELI, Phys. Dept., University of Pisa, Italy, A. SGATTONI, Dip.di Energia, Politecnico di Milano, Italy, A. MACCHI, 1CNR/INO, Pisa, Italy, F. PEGORARO, Phys. Dept., University of Pisa, Italy — The filamentation instability in relativistic e^+-e^- pair plasmas is relevant to several astrophysical contexts, such as GRBs, AGNs and pulsar wind nebulae. 1D3P and 2D3P relativistic PIC simulations were carried out to study the filamentation instability in the extreme conditions typical of these astrophysical scenarios. Counter-propagating charge neutral beams with γ factor in the range $1, 1000$ were simulated in a symmetric configuration. Long-runs were performed in order to explore the nonlinear saturation phase far beyond the well understood linear growth phase. In both 1D and 2D simulations, during the final stage of the linear phase, a small fraction of the particles was accelerated up to twice their initial momentum. These particles are not confined by the filamentary structures of the magnetic field. The particle energy spectrum shows a broad distribution with a bump on the high energy tail. Radiation Reaction effects due to Radiative losses were included in the simulations. Significant energy losses were observed for $\gamma > 100$ and pair plasma density $> 10^{20}$ cm^{-3}. While the magnetic field structures were only mildly affected by these losses, particles in the high energy tail of the distribution were significantly decelerated.

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