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PhD Thesis Abstract

Numerical study of light-pair plasmas interaction mechanisms in relativistic and high fields scenarios

Electron-positron plasmas are present in many astrophysical scenarios, such as the magneto-sphere of supernova remnants, and their unity mass ratio leads to different plasma dynamics than e-ion plasmas. Around neutron stars or black holes, the presence of ultra intense magnetic and electric fields alters even more the behaviour of pair plasmas, as QED processes become relevant. In such scenario, hard photon emission and pair creation represent sink of energy and source of matter for the plasma respectively. In addition, processes as Compton scattering may alter the interaction between particles as it is not regulated by collective electromagnetic fields only but also by momentum and energy exchange mediated by photons. The behaviour of this plasma still needs to be addressed and will be the scope of this thesis.