R008-09
C 会場 ：11/26　AM2 （10:30-12:00）
11:15〜11:30

電子・陽電子プラズマ中の直線偏光電磁波

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Linearly Polarized Electromagnetic Waves in Electron-Positron Plasmas

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Large-amplitude plasma waves are ubiquitous in the universe. They are subject to the non-linear wave − plasma interaction such as parametric instability, which plays a significant role for particle acceleration/heating and MHD turbulence. Recently, the non-linear wave − plasma interaction has attracted attention from astrophysics in the context of Fast Radio Bursts (FRBs). FRBs are extremely bright millisecond duration pulses at radio frequency (Lorimer et al. 2007) and often show a high degree of linear polarization (e.g., Michilli et al. 2018). Magnetars are one of the promising progenitors (e.g., Andersen et al. 2020; Lyubarsky 2021) and thus the FRB radio pulse propagates through the magnetar wind, which consists of a pair (electron − positron) plasma. The non-linear wave − plasma interaction between linearly polarized electromagnetic waves and pair plasmas must be considered for the propagation of FRB radio pulses. In this study, we analytically derive the steady-state solution of the linearly polarized electromagnetic waves in cold pair plasmas for arbitrary wave amplitude and frequency. We will demonstrate the time evolution of the steady-state solution by using the particle-in-cell simulations and discuss the effect of the non-linear wave − plasma on the propagation of FRB radio pulses.