

Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

On properties of QED plasmas¹ MIKHAIL MEDVEDEV, Univ of Kansas — Current advances in laser-plasma and astrophysical observations of magnetar emission demand better understanding of how quantum electrodynamics (QED) effects that are present in strong-field environments affect plasma dynamics. Interestingly, astrophysical systems such as extremely strongly magnetized neutrons stars, called ‘magnetars’ possess magnetic fields far in excess of the Schwinger (critical) field, so these effects can no longer be ignored. In particular, Maxwell’s equations become nonlinear in the strong-QED regime. This effect has not, so far, been incorporated in plasma codes; systemic theoretical studies of QED-plasmas are also absent. Here we present the derivation of the general equation of linear plasma modes in QED-plasma with arbitrarily strong magnetic field. We discuss general trends and some properties of the low-frequency modes. These results can be of interest for understanding of electron-positron plasma in a magnetar magnetosphere, as well as future lab experiments.

¹Supported by the DOE grant DE-SC0016368 and the DOE EPSCOR grant DE-SC0019474. MM thanks the Razumovsky Moscow State University, NRC Kurchatov Institute and Moscow Institute of Physics and Technology.

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Date submitted: 29 Jun 2020

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