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Anomalous Electromagnetism in QCD at intermediate baryonic densities

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In this talk, the anomalous transport properties of the spatially inhomogeneous phase of dense quark matter known as the Magnetic Dual Chiral Density Wave (MDCDW) phase will be reviewed. I will discuss several anomalous electromagnetic effects that can take place in this phase at low temperatures and intermediate baryonic densities. I will present the axion electrodynamics characterizing this phase. Then, going beyond mean-field approximation, I will show how linearly polarized electromagnetic waves that penetrate the MDCDW medium mix with the phonon fluctuations to give rise to two hybridized modes of propagation called axion polaritons. I will discuss how the formation of axion polaritons in the MDCDW core of a neutron star can add mass to the star via the Primakoff effect, which eventually can trigger the star collapse under the bombardment of gamma-ray bursts. This mechanism can provide a possible solution to the missing pulsar problem in the galactic center.

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