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Axion Polariton in Magnetized Dense Quark Matter

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In this talk we review the topological properties and possible astrophysical consequences of a spatially inhomogeneous phase of quark matter, known as the Magnetic Dual Chiral Density Wave (MDCDW) phase, that can exist at intermediate baryon density in the presence of a magnetic field. Going beyond mean-field approximation, we show how linearly polarized electromagnetic waves penetrating the MDCDW medium can mix with the phonon fluctuations to give rise to two hybridized modes of propagation: a rotated photon and a massive axion polariton. The formation of axion polaritons in the MDCDW core of a neutron star can add mass to the star via the Primakoff effect, eventually triggering the star collapse. This mechanism provides a possible solution to the missing pulsar problem in the galactic center.

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