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Chiral magnetic waves in quark matter inside neutron stars and gravitational waves

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It is important to unravel the internal structure of neutron stars in astrophysics. One effective way to study the interior of neutron stars is analyzing their seismic oscillations. Recently, the chiral magnetic wave (CMW), which is a density wave propagating along magnetic fields due to the chirality of fermions, has been studied in the context of the heavy ion collision experiments.

In this talk, we show that the CMW can appear as a seismic oscillation in quark matter, such as the two-flavor color superconductivity, inside neutron stars. We also discuss the frequency and amplitude of a new type of gravitational wave radiated by the seismic oscillation. This gravitational wave could be a new probe of the magnetic field and quark matter in neutron stars.

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