

Phase diagram and dualities of dense baryonic matter with chiral imbalance

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In this talk the phase structure of the dense baryonic/quark matter has been investigated in the presence of baryon, isospin, chiral and chiral isospin chemical potentials in the framework of Nambu–Jona-Lasinio model. It has been shown that in the large- N_c limit there exist several dualities of the phase portrait. One of the key conclusions of our studies is the fact that chiral imbalance generates charged pion condensation in dense baryonic/quark matter even in the case of charge neutral matter, which is interesting in the context of the astrophysics of neutron stars. It was also shown that our results in particular cases are consistent with the simulation of lattice QCD. Our studies show that different types of chiral imbalances can occur in the cores of neutron stars or in heavy ion collision experiments where large baryon densities can be reached, due to the so-called chiral separation and chiral vortical effects.

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