On superconductivity of matter at high density and the effects of inducing nuclear chirality in molecular structures - DTU Orbit (11/12/2018)

Superconductivity is described by the well-known Bardeen-Cooper-Schrieffer (BCS) theory, which is a symmetry breaking approximation. Color superconductivity shows up in extremely high density matter and temperature, which is here investigated and compared to the other end of the scale of low energy/temperature of organic superconductors. An approach to color superconductivity conciliating the BCS theory with the color SU(3) symmetry, the cornerstone of the rigorous theory of the strong interaction, Quantum Chromo-Dynamics (QCD), is used to describe the superconducting phase. The magnetization of a high density relativistic fluid of elementary particles is studied. We find that the magnetic field of spin polarized matter with densities of 2 to 30, where 0 is the equilibrium density of nuclear matter, is rather huge, of the order of 10^{17} Gauss. Finally we look at the chiral nature of nuclear forces and interactions as they possibly relate to chirality of nuclei (atoms) in molecules as a source of chirality in amino acids and hence in life. Previous works have not investigated the nuclear forces as a possible bias which initiated the bias towards L-amino acids as the building blocks on proteins, and later life.