Crystalline Color Superconductivity

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Abstract

Cold dense quark matter is unstable to the formation of a color superconducting condensate. In a realistic setting where pairing occurs between species of quarks with different number densities, Cooper pairs with nonzero total momentum may be favored, as in a LOFF (Larkin-Ovchinnikov-Fulde-Ferrell) electronic superconductor. A condensate of such Cooper pairs spontaneously breaks rotational and translational invariance, imposing a periodic crystalline structure on the system. In a neutron star this crystalline quark matter may pin rotational vortices at lattice sites, leading to potentially observable spindown glitches.

Preprint submitted to Elsevier Preprint *20 December 2000*