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Magnetic Field-Induced Stability in Two-Flavor Color Superconductivity C. BHANDARI, E.J. FERRER, V. DE LA INCERA, University of Texas at El Paso — It has long been understood that the ground state of a superdense quark system, a Fermi liquid of weakly interacting quarks, is unstable with respect to the formation of diquark condensates. This nonperturbative phenomenon is essentially equivalent to the Cooper instability of conventional BCS superconductivity. As the quark pairs have nonzero color charge, this kind of superconductivity breaks the SU(3) color gauge symmetry, thus it is called color superconductivity. A peculiar feature of spin-zero color superconductivity is the lack of Meissner effect for a combination of the regular electromagnetic field and one of the gluon fields. This combination behaves as an in-medium electromagnetic field and as a consequence, a regular magnetic field can penetrate the color superconductor through its long-range in-medium component. Since the conditions of very high dense matter and very strong magnetic fields are naturally found in neutron stars, the investigations of magnetic field effects in color superconductivity are relevant for astrophysics. In this work we investigate the effects of an external magnetic field in the stability of the ground state of a neutral two-flavor color superconductor. Our results show that a strong magnetic field tends to increase the stability of the ground state, moving it from the unstable gapped region to the stable one.

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