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Antineutrino Emission via the Direct Urca Process in Strongly Magnetized Neutron-Stars[1] GRANT MATHEWS, University of Notre Dame, TOMOYUKI MARUYAMA, Nihon University, A. BAHA BALANTEKIN, U. Wisconsin, MYUNG-KI CHEOUN, Soongsil University, TOSHITAKA KAJINO, NAOJ, MOTOHIKO KUSAKABE, Beihang University — We have applied a relativistic quantum framework to analyze the antineutrino emission via the direct Urca process in strongly magnetized neutron stars, i.e. magnetars. We calculate the neutrino emissivity from the direct Urca process whereby a neutron converts to a proton, an electron and an antineutrino. We solve for the exact wave functions for protons and electrons in the states described by Landau levels. We find that the direct Urca process in the presence of strong magnetic fields can occur in density regions where this process would not normally occur because of the kinematical condition.

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