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High B-field Limit of Magnetic Oscillations in Magnetars
MATTHEW RAVE, ENRIQUE GOMEZ, Western Carolina University — Magnetars are neutron stars with the highest known magnetic fields. Magnetars periodically undergo violent resurfacing events, which would be expected to alter the crystalline structure of the crust and the Fermi surface as a consequence. One could find the structure of the Fermi surface using de Haas-van Alphen-type oscillations, which exist at magnetic fields characteristic of magnetars. To a first approximation we can treat the crust of a magnetar as a Fermi gas of free electrons inside a periodic lattice of iron atoms, which allows us to use the results of condensed matter theory (such as Bloch's theorem). We calculate the upper **B**-field limit of magnetic oscillations of free electrons at the crust. Above a critical **B**-field value all electrons collapse into a single Landau level and therefore de Haas-van Alphen-type oscillations cease.

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