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Effect of Gap on Quantum Oscillations HRIDIS PAL, FRDRIC PICHON, Laboratoire de Physique des Solides, Universit Paris-Sud, JEAN-NOL FUCHS, Laboratoire de Physique Thorique de la Matire Condense, Universit Pierre et Marie Curie, Paris, MARK GOERBIG, GILLES MONTAMBAUX, Laboratoire de Physique des Solides, Universit Paris-Sud — One of the manifestations of the quantization of energy levels in a magnetic field is quantum oscillations. In a metal, oscillations in several physical observables occur each time a Landau level crosses the Fermi level, and is, therefore, a Fermi surface property. In a gapped system, since there is no Fermi surface, such oscillations are not expected. One can ask, what happens to these oscillations as a metal is slowly turned into an insulator by introducing a gap at the Fermi level. To address this, we consider a simple model of two overlapping bands that hybridize to open a gap, and investigate how the oscillations change as the gap is slowly increased, both at zero and non-zero temperature. We show that the oscillations in such gapped systems show marked deviation from the canonical Lifshitz-Kosevich results routinely used to study quantum oscillations in metals.

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