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Phase transitions induced by magnetic field in graphite BENOIT FAUQUE, LPEM (UPMC-CNRS), Ecole Suprieure de Physique et de Chimie Industrielles, 75005 Paris, France, DAVID LEBOEUF, Laboratoire National des Champs Magnetiques Intenses, UPR 3228, CNRS-UJF-UPS-INSA, 38042 Grenoble, France, WILLEM RISCHAU, LPEM (UPMC-CNRS), Ecole Suprieure de Physique et de Chimie Industrielles, 75005 Paris, France, WOJCIECH TABIS, BAPTISTE VIGNOLLE, CYRIL PROUST, Laboratoire National des Champs Magnetiques Intenses, CNRS, INSA, UJF, UPS, Toulouse 31400, France, KAMRAN BEHNIA, LPEM (UPMC-CNRS), Ecole Suprieure de Physique et de Chimie Industrielles, 75005 Paris, France — Graphite is compensated semi-metals characterized by a tiny three dimensional Fermi surface. A magnetic field of about 10T is large enough to confine electrons and holes to their lowest Landau levels. These are therefore ideal candidates to explore the nature of the electronic ground state of a three-dimensional electron gas pushed beyond the so-called quantum limit. Various instabilities have been predicted in this peculiar limit where electronic interactions are enhanced. We find that the magnetic field induces two successive phase transitions, made of two distinct ordered states, each restricted to a finite field window. In both states, the in-plane and out-of plane conductivity behaves differently : not only the onset of the transition are different in both quantity but also an energy gap opens up in the out-of-plane conductivity and coexists with an unexpected in-plane metallicity for a fully gap bulk system. Such peculiar metallicity may arise as a consequence of edge-state transport expected to develop in the presence of a bulk gap.

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