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Negative c-axis Magnetoresistance in Graphite YAKOV KOPELEVICH, Hewlett-Packard Laboratories, 1501 Page Mill Road, Palo Alto, California 94304, USA, ROBSON R. DA SILVA, J.C. MEDINA PANTOJA, Instituto de Física "Gleb Wataghin," Universidade Estadual de Campinas, UNICAMP 13083-970, Campinas, São Paulo, Brasil, ALEX M. BRATKOVSKY, Hewlett-Packard Laboratories, 1501 Page Mill Road, Palo Alto, California 94304, USA — Aiming to verify the possible behavior of graphite as a stack of graphene layers, we have studied in this work the c-axis (interlayer) magnetoresistance (ILMR), $R_c(B)$. The measurements have been performed on strongly anisotropic highly oriented pyrolytic graphite samples in magnetic field of up to B = 9T applied both parallel and perpendicular to the sample c-axis, and temperatures 2 K $\leq$ T $\leq$ 300 K. We observed the negative magnetoresistance (MR), $dR_c/dB < 0$, for B||c above a certain field $B_m(T)$ that reaches its minimum value B_m = 5.4 T at T = 150 K. The results can be consistently understood assuming that ILMR is related to a tunneling between zero-energy Landau levels of quasi-two-dimensional Dirac fermions, in a close analogy with the behavior reported for α-(BEDT-TTF)$_2$I$_3$ [N. Tajima et al., Phys. Rev. Lett. 102, 176403 (2009)], another multilayer Dirac electron system.

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