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Klein Backscattering and Fabry-Perot Interference in Graphene Heterojunctions ANDREI SHYTOV, University of Utah, MARK RUDNER, Harvard University, LEONID LEVITOV, Massachusetts Institute of Technology — Fabry-Perot (FP) interference in a lateral p-n-p structure in graphene is proposed as a vehicle to probe Klein scattering phenomenon [Phys. Rev. Lett. 101, 156804 (2008)]. In ballistic regime, interference between waves scattered from p-n interfaces leads to oscillations in conductance as a function of electron density. Perfect transmission at zero incidence angle (Klein effect) implies a sign change of the back-reflection amplitude. This change contributes a phase π to interference and shifts FP fringes by half a period. Alternatively, the π phase can be understood as Berry's phase accrued by electron bouncing between p-n boundaries. This effect is revealed in the evolution of fringes when a relatively weak, non-quantizing magnetic field is applied. The behavior of the interference fringes recently observed by Young and Kim (arXiv:0808.0855) is consistent with this picture. The observed crossover to Shubnikov-de Haas oscillations can be also understood from quantization of perioidic orbits bouncing between the two p-n interfaces.

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