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Quenching of quantum Hall effect and the role of undoped planes in epitaxial graphene PIERRE DARANCET, NICOLAS WIPF, DIDIER MAYOU, Institut NEEL CNRS/UJF, 25 rue des Martyrs BP166, 38042 Grenoble — We propose a mechanism for the quenching of the Shubnikov de Haas oscillations and the quantum Hall effect observed in epitaxial graphene. This involves a coupling between the uncharged rotationally stacked layers and the charged graphene layer at the interface. In a magnetic field, the extraordinary graphene $n = 0$ Landau level of the uncharged layers produces a high density of states at the Fermi level. Consequently we find that the scattering time of the conduction electron in the charged plane is magnetic field dependent and reduced to the order of the cyclotron orbit period. This scenario also explains quantitatively the recent observation of a linear magnetoresistance in epitaxial graphene.

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