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Electronic properties of graphene multilayers FRANCISCO GUINEA, Instituto de Ciencia de Materiales de Madrid. CSIC. Cantoblanco. 28049 Madrid. Spain., ANTONIO H. CASTRO NETO, Department of Physics. Boston University. 590 Commonwealth Av. Boston MA02115, NUNO M.R. PERES, Departamento de Física. Universidade do Minho. Braga. P-4710-057 Portugal —
The electronic structure, screening properties, and charge distribution in stacks of graphene layers is studied. We analyze: i) The stability of Dirac points as function of the ordering of the stack and the number of layers, ii) The existence of surface bands at the top and bottom layers for some stack orderings, iii) The appearance of gaps induced by inhomogeneous charge distributions, and iv) The charge induced by external electric fields. We find that electronic bands with linear, Dirac like, dispersion exist in stacks with the Bernal stacking and an odd number of layers, and for rhombohedral stacking. In tha last case, a dispersionless surface band is also formed. In the presence of interlayer hopping, the dielectric response of a stack with the Bernal ordering favors the formation of a charge density wave with periodicity equal to twice the interlayer spacing. In doped stacks, the charge will accumulate at the surfaces, and present an even-odd modulation.

Francisco Guinea
Instituto de Ciencia de Materiales de Madrid
CSIC Cantoblanco. 28049 Madrid

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