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Magnetic field confinement in graphene with Gaussian deformations MARTIN SCHNEIDER, Freie Universitaet Berlin, Germany, DAIARA FARIA, UFF, Niteroi, Brazil, SILVIA VIOLA KUSMINSKIY, Freie Universitaet Berlin, Germany, NANCY SANDLER, Ohio Univ., Ohio, USA — It has been proposed that graphene holds the potential for novel transport properties under the combined effect of deformations and external fields. Strain produced by deformations results in a pseudomagnetic field that substantially modifies the real space density of states. Analogously, external magnetic fields provide a controllable mechanism to confine states in graphene. To investigate how strain and magnetic fields combine to produce peculiar electronic properties, we study a model for graphene in the presence of an out-of-plane deformation, in the continuum limit. In particular, we focus on a Gaussian height profile that produces an inhomogeneous pseudomagnetic field with trigonal symmetry. We address the question of confinement of electrons due to this deformation, using a scattering formalism based on the Dirac equation description of graphene. Our results reveal a space dependent enhancement of the local density of states as the deformation is introduced. In analogy with the Landau level formation and confined states produced by constant magnetic fields, we discuss the formation of local Landau levels and confined states by the deformation and how the two combined effects affect the transport properties of the system.

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