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Electronic compressibility of a graphene bilayer SILVIA VIOLA KUSMINSKIY, Boston University, JOHAN NILSSON, Boston University and Leiden University, DAVID CAMPBELL, ANTONIO CASTRO NETO, Boston University — We calculate the electronic compressibility arising from electron-electron interactions for a graphene bilayer within the Hartree-Fock approximation. We show that, due to the chiral nature of the particles in this system, the compressibility is rather different from those of either the two-dimensional electron gas or ordinary semiconductors. We find that an inherent competition between the contributions coming from intra-band exchange interactions (dominant at low densities) and inter-band interactions (dominant at moderate densities) leads to a non-monotonic behavior of the compressibility as a function of carrier density.

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