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Magnetic and Kohn-Luttinger instabilities near a Van Hove singularity: monolayer versus twisted bilayer graphene JOSE GONZALEZ, Instituto de Estructura de la Materia (CSIC), Madrid, Spain — We report on the many-body instabilities of electrons interacting near Van Hove singularities arising in monolayer and twisted bilayer graphene. It is found that a pairing instability must be dominant over the tendency to magnetic order as the Fermi level is tuned to the Van Hove singularity in the conduction band of graphene. As a result of the extended character of the saddle points in the dispersion, the pairing of the electrons takes place preferentially in a channel of f-wave symmetry, with an order parameter vanishing at the position of the saddle points along the Fermi line. In the case of the twisted bilayers, the dispersion has instead its symmetry reduced down to the C_3v group and, most importantly, it leads to susceptibilities that diverge at the saddle points but are integrable along the Fermi line. This implies that a ferromagnetic instability becomes dominant in the twisted graphene bilayers near the Van Hove singularity, with a strength which is amplified as the lowest subband of the electron system becomes flatter for decreasing twist angle.

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