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Spin-density-wave instability in graphene doped near the van Hove singularity RALPH VAN GELDEREN, DMYTRO MAKOGON, Utrecht University, RAFAEL ROLDÁN, Instituto de Ciencia de Materiales de Madrid, CRISTIANE MORAIS SMITH, Utrecht University — We study the instability of the metallic state towards the formation of a new ground state in graphene doped near the van Hove singularity. The system is described by the Hubbard model and a field theoretical approach is used to calculate the charge and spin susceptibility. We find that for repulsive interactions, within the random phase approximation, there is a competition between ferromagnetism and spin-density wave (SDW). It turns out that a SDW with a triangular geometry is more favorable when the Hubbard parameter is above the critical value $U_c(T)$, which depends on the temperature T, even if there are small variations in the doping. Our results can be verified by ARPES or neutron scattering experiments in highly doped graphene.

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