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Controlling spin polarization in graphene by cloaking magnetic and spin-orbit scatterers DIEGO PEREIRA, TATIANA RAPPOPORT, Universidade Federal do Rio de Janeiro — Because of its very particular structure, electrons in the graphene behave like massless relativistic particles and the electronic properties of this material can be described in terms of Dirac fermions, which allow us to use the Dirac equation of relativistic quantum mechanics and all its properties. In this work, we consider scatterers that induce Zeeman spin-orbit and intrinsic spin-orbit coupling on the surface of graphene with a length comparable with the size of the electronic wave. Starting with an analogy with the optics, we consider a cloak around the scatterer and, using partial waves expansions, we show that a combination of resonant scattering and the variation of the cloak parameters can produce an efficient control of the spin-dependent transport, like spin current polarization and spin Hall angle

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