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Spin-orbit induced spin-density wave in a quantum wire JIAN-MIN SUN, SUHAS GANGADHARAIAH, OLEG STARYKH, University of Utah — We study an interacting quantum wire in the presence of magnetic field and spin-orbit interaction.We show that in weak spin-orbit and strong magnetic field,the spin-density wave(SDW) state is stabilized when the magnetic field and spin-orbit axes are orthogonal.The spin ordering takes place along the direction of spin-orbit axis and perpendicular to the magnetic field. We next analyze charge transport in the presence of single weak impurity. We find with the SDW state stabilized single particle backscattering off a nonmagnetic impurity becomes irrelevant. The sensitivity of the SDW state, and hence the charge transport, to the mutual orientation and magnitude of the magnetic and spin-orbit terms can be used for the experimental verification of this novel spin- orbit mediated state.

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