

Abstract Submitted
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Spin current and rectification in quantum wires¹ FEIFEI LI, Department of Physics, Brown University, Providence, Rhode Island 02912 USA, BERND BRAUNECKER, Department of Physics and Astronomy, University of Basel, Klingelbergstrasse 82, CH-4056 Basel, Switzerland, DIMA FELDMAN, Department of Physics, Brown University, Providence, Rhode Island 02912, USA — We study the spin and charge currents in a one-channel quantum wire with strong electron interactions in a uniform static magnetic field. We show that a dc-spin current can be generated by an ac voltage in the presence of an asymmetric potential barrier, e.g., two point scatterers of unequal strength. In an interval of voltages, the spin current increases with the decrease of the voltage bias as a negative power of the voltage. We find that the spin dc-current in units of $\hbar/2$ per second can greatly exceed the charge current in units of electron charge per second. Neither spin-polarized particle injection nor time-dependent magnetic fields are required for the generation of the spin current.

[1] D. E. Feldman, S. Scheidl, and V. M. Vinokur, Phys. Rev. Lett. 94, 186809 (2005).

[2] Bernd Braunecker, D. E. Feldman, and Feifei Li, Phys. Rev. B 76, 085119 (2007).

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