Persistent current in continuous one-dimensional quantum ring: Hartree-Fock and quantum Monte Carlo study. P. VAGNER[1], Department of Physics, North Carolina State University, Raleigh, NC 27695, R. NÉMETH, M. MOŠKO, Institute of Electrical Engineering, Slovak Academy of Sciences, Dúbravská cesta 9, 841 04 Bratislava, Slovakia, L. MITAS, Department of Physics, North Carolina State University, Raleigh, NC 27695 — We study numerically the effects of the electron-electron interaction on the persistent current of a one-dimensional quantum ring containing a single δ-barrier. Using the self-consistent Hartree-Fock approximation for spinless electrons, we calculate the zero-temperature persistent current as a function of the ring circumference, magnetic flux threading the ring, barrier strength, electron-electron interaction strength, etc. Next, we explore the many-body quantum Monte Carlo method to obtain fully correlated solutions for the steady state wave functions and to evaluate the transport properties for the same problem.

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