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Spin interference effects in a 2D-hole ring with spin-orbit interaction. ALEXEY KOVALEV, MARIO BORUNDA, JAIRO SINOVA, Department of Physics, Texas A&M University, College Station, TX 77843-4242, USA — We study the quantum interference effects in one-dimensional heavy hole (HH) rings with spin-orbit interaction realizable in HgTe quantum wells. The influence of the spin-orbit interaction strength on the transport is investigated analytically and numerically. The analytical results allow us to explain the interference effects as a signature of Berry phases. We compare our results with the previous studies on the electron Rashba systems and find more rapid oscillations as a function of the spin-orbit strength. The structures with stronger signature of the spin-orbit strength can lead to more sensitive spintronic devices that enable observation of quantum interference effects and control of spin at mesoscopic scales.

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