Abstract Submitted
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Current-driven quantum switch[1] M.V. MILOSEVIC, Departement Ftsica, Universiteit Antwerpen, Belgium, A. KANDA, S. HATSUMI HATSUMI, Institute of Physics and TIMS, University of Tsukuba, Japan, F.M. PEETERS, Departement Ftsica, Universiteit Antwerpen, Belgium, Y. OOTUKA, Institute of Physics and TIMS, University of Tsukuba, Japan — As a key component of a ballistic quantum switch proposed by Mel'nikov and Vinokur [Nature **415**, 60 (2002)], we realize the current-driven *giant-vortex splitting* in a mesoscopic superconducting square, in a given perpendicular magnetic field. We also demonstrate the controllable *current-induced transitions* between the states with different angular momenta, which provide the stepwise behavior of the up-down sample conductance as a function of applied current (not field). Theoretical simulations using time-dependent Ginzburg-Landau theory are fully corroborated by transport measurements, where vortex states are monitored using the small-tunnel-junction technique.

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