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Atomic Josephson Vortex[1] VITALIY KAUROV, ANATOLY KUKLOV, CSI, CUNY — We show that atomic Josephson vortices [1] in a quasi-1D atomic junction can be controllably manipulated by imposing a tunneling bias current created by a difference of chemical potentials on the atomic BEC waveguides forming the junction. This effect, which has its origin in the Berry phase structure of a vortex, turns out to be very robust in the whole range of the parameters where such vortices can exist [2]. Acceleration of the vortex up to a certain threshold speed, determined by the strength of the Josephson coupling, results in the phase slip causing switching of the vorticity. This effect is directly related to the interconversion [1], when slow variation of the coupling can cause transformation of the vortex into the dark soliton and vice verse. We also propose that a Josephson vortex can be created by the phase imprinting technique and can be identified by a specific *tangential* feature in the interference picture produced by expanding clouds released from the waveguides [2].

[1] V. M. Kaurov , A. B. Kuklov, Phys. Rev. A 71, 11601(R) (2005).
[2] V. M. Kaurov , A. B. Kuklov cond-mat/0508342

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Vitaliy Kaurov
CSI, CUNY

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