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Hierarchy of Supercurrents in Multicomponent Atomic Josephson Vortices VITALIY KAUROV, CSI, CUNY — We show that a quasi-1D long atomic Josephson junction [1,2] containing a mixture of BECs can sustain multicomponent Josephson vortices (mJV). A new exact soliton solution is given to describe a stationary mJV in the general N-component case. Depending on system parameters (scattering lengths, tunneling strengths, and chemical potentials) Josephson supercurrents of different components form a hierarchy according to their intensity and proximity to phase slip. By tuning the parameters it is possible to turn off or on particular currents using the JV – dark soliton interconversion effect [1,2]. Inside the mJV different components may circulate either in the same or opposite directions resulting in bulk super-counter-flow in the latter case. The weak tunneling limit can be described by a modified Sine-Gordon model. An approximate solution for mJV propagating along the junction is found for the two-component case. The degeneracy of stationary mJV with respect to co-flow or counter-flow configurations is lifted by the uniform motion of mJV. Which configuration is energetically preferable depends on the interspecies scattering length. [1] V. M. Kaurov and A. B. Kuklov, Phys. Rev. A 71, 011601(R) (2005). [2] V. M. Kaurov and A. B. Kuklov, Phys. Rev. A 73, 013627 (2006).

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