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Interaction Driven Interband Tunneling of Bosons in the Triple Well PETER SCHMELCHER, YIANNIS BROUZOS, University of Hamburg, SASCHA ZOELLNER, University of Copenhagen, LUSHUAI CAO, University of Hamburg, UNIVERSITY OF HAMBURG TEAM, UNIVERSITY OF COPENHAGEN COLLABORATION — We study the tunneling of an ensemble of bosons in a triple-well potential with strong repulsive interaction. The usual treatment within the single-band approximation suggests suppression of tunneling in the strong interaction regime. However, we show that several windows of enhanced tunneling are opened in this regime. This enhanced tunneling results from higher band contributions, and has the character of interband tunneling. It can give rise to various tunneling processes, such as single-boson tunneling and two-boson correlated tunneling of the ensemble of bosons, and is robust against deformations of the triple well potential. We introduce a basis of number states including all contributing bands to explain the interband tunneling, and demonstrate various patterns of interband tunneling and its robustness by numerically exact calculation.

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