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Dynamics of Bose gases in Y-shaped potential and Andreev-type reflection AKIYUKI TOKUNO, Tokyo Institute of Technology, MASAKI OSHIKAWA, Institute for Solid State Physics, EUGENE DEMLER, Harvard University — Recently, guiding of atoms in low-dimensional magnetic traps has been actively studied. While the theory of one-dimensionally trapped atoms has been vigorously studied, much of the dynamical aspects remain unexplored. As a simple yet nontrivial example, we study the real-time dynamics of BEC in the Y-shaped potential. Collective nature of the transport is considered by treating each one-dimensional channel as a Tomonaga-Luttinger liquid. We analytically investigate the reflection and transmission at the center of the potential, for a high-density packet moving from one side to the other sides. Even though we study a system of bosons, we find that the reflection at the center of the potential exhibits an Andeev-type reflection reminiscent of that at a normal-superconductor interface in electron systems. This could be attributed to the fermionic nature of the repulsively interacting Bose systems in one dimension. In addition, we shall also discuss the dynamics in the ring type interferometer which consists of two symmetric Y-junction.

Akiyuki Tokuno
Tokyo Institute of Technology

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