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A quantum Monte Carlo study of the two-component mixture of hard-core bosons in one dimension MIN-CHUL CHA, JONG-GEUN SHIN, INHO JEON, Hanyang University — The two-component mixture of hard-core bosons in one dimension is studied by quantum Monte Carlo simulations. A rich variety of phases exists in the parameter space of the inter-species interaction strengths, the ratio of the hopping amplitudes between two species, and the filling fractions. Physical properties of different phases are investigated by measuring the superfluid stiffness, the counter-flow stiffness, the compressibility, and the structure factor. We examine the nature of some phase transitions between a superfluid and an insulator and the 1st-order transition in the occurrence of phase separations.

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