

Exact vector-soliton solutions in two-species Bose-Einstein condensates with arbitrary scattering lengths

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We investigate the vector-soliton solutions of two-species Bose-Einstein condensates with arbitrary scattering lengths. The results show that, for quasi-one-dimension homogeneous systems, exact solutions exist even in the regime where the nonlinear system is non-integrable. In addition, these vector solitons can be dynamically stable in the presence of soft trapping potentials. Different types of vector solitons may be realized and converted to each other by tuning the inter-species interaction strength.

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