

Quantum Droplet in Heteronuclear Double Bose-Einstein Condensates

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According to the mean-field theory, a Bose-Einstein condensate (BEC) will collapse when the interaction between the particles is attractive. However, in a mixture of two BECs, the attractive interspecies interaction can be stabilized by the beyond mean-field Lee-Huang-Yang correction leading to the format of stable self-bound quantum liquid droplets. In this talk, I will present our investigation on the heteronuclear quantum droplet with a mixture of Rb and Na BECs. When setting the interspecies scattering length to large enough negative values with the help of an interspecies Feshbach resonance, we observed the self-bound behavior as the signature of the Na-Rb droplet. The latest results on the liquid-to-gas transition phase diagram and formation dynamics will also be discussed.

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