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Quantum droplet in a mixture of Rb and Na Bose-Einstein condensates¹ ZHICHAO GUO, FAN JIA, LINTAO LI, DAJUN WANG, The Chinese University of Hong Kong — According to the mean-field theory, an atomic Bose-Einstein condensate (BEC) will collapse when the interaction between atoms is attractive. However, the mixture of two BECs with attractive interspecies interaction can be stabilized by the beyond mean-field Lee-Huang-Yang correction in the format of self-bound quantum droplets [1, 2, 3]. In this poster, I will present our progress in studying the heteronuclear quantum droplet with the double BEC of Rb and Na atoms. With the help of an interspecies Feshbach resonance, we have created double BECs with nearly arbitrary interaction strengths and signs. When setting the interspecies scattering length to larger enough negative values, we observe the self-bound behavior as the signature of the Na-Rb droplet during the time of flight expansion upon releasing the mixture from the optical trap. Future plan for studying the phase diagram and formation dynamics will also be discussed.

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