

## Nucleation of 1/3-vortices in a rotating and rapid quenched $F = 2$ spinor Bose-Einstein condensate in the cyclic state

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By solving the stochastic projected Gross-Pitaevskii equation, we theoretically study the formation of the fractional vortices of  $F = 2$  spinor Bose-Einstein condensates in the cyclic state during the rotating evaporative cooling. Our numerical calculations show that stable 1/3-vortices of the spinor BEC in the cyclic state can be created in the resultant spin textures. The core structures and modulational instabilities of the single 1/3-vortices are investigated. By solving the stochastic projected Gross-Pitaevskii equation, we theoretically study the formation of the fractional vortices of  $F = 2$  spinor Bose-Einstein condensates in the cyclic state during the rotating evaporative cooling. Our numerical calculations show that stable 1/3-vortices of the spinor BEC in the cyclic state can be created in the resultant spin textures. The core structures and modulational instabilities of the single 1/3-vortices are investigated.