

Abstract Submitted
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Observation of Topologically Stable 2D Skyrmions in an Antiferromagnetic Spinor Bose-Einstein Condensate¹ JAEYOON CHOI, WOO JIN KWON, SANG WON SEO, YONG-IL SHIN, Seoul National University, SEOUL NATIONAL UNIVERSITY TEAM — We report the creation and time evolution of two-dimensional (2D) skyrmion excitations in quasi-2D polar Bose-Einstein condensate of $F=1$ ^{23}Na atoms, where the 2D skyrmion is topologically protected.² Spin rotation method was used for imprinting the skyrmion spin textures in a controllable manner. The skyrmion was observed to be stable on a short time scale of a few tens of ms but to dynamically deform its shape and eventually decay to a uniform spin texture. The decay dynamics involves breaking the polar phase inside the condensate without having topological charge density flow through the boundary of the finite-sized sample. We discuss the possible formation of half-quantum vortices in the deformation process.

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²J. Choi, W. J. Kwon, and Y. Shin, Physical Review Letters 108, 035301 (2012).

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