Physicists show skyrmions can exist in ferroelectrics

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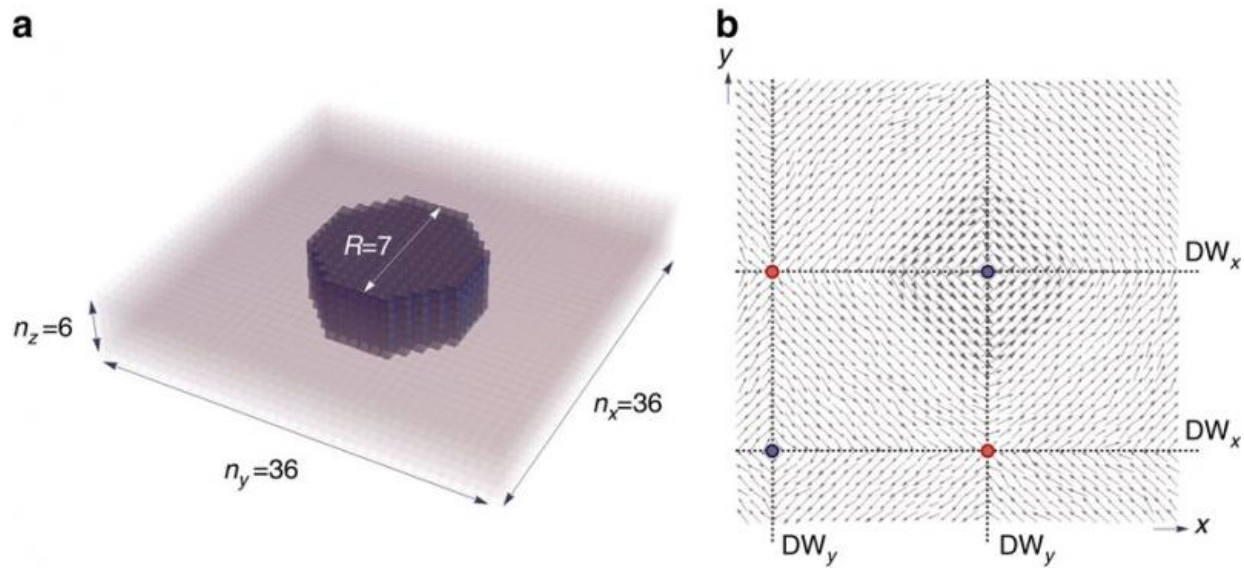

Schematic representation of the structure and dipolar configuration of the vortex state. Credit: *Nature Communications* 6, Article number: 8542 doi:10.1038/ncomms9542

New theoretical physics research shows that swirling particles known as skyrmions, which have been found in magnetic systems, can also exist in ferroelectrics.

An international team of physicists, led by University of Arkansas postdoctoral research associates Yousra Nahas and Sergei Prokhorenko,

published its findings in *Nature Communications*, an online journal published by the journal *Nature*. The study has also been highlighted in *Nature Physics*.

Nahas said the discovery of these electrical skyrmions was challenging because ferroelectrics lack certain interactions that are usually thought to be necessary for stabilizing skyrmions in magnetic systems.

"Skyrmions have been extensively investigated in magnets but not in ferroelectrics," said Laurent Bellaiche, Distinguished Professor of physics at the University of Arkansas. "In this study, we demonstrated that the stabilized electrical skyrmion can be as small as a few nanometers, revealing prospective skyrmion-based applications of ferroelectric nanocomposites."

Ferroelectrics convert changes in mechanical energy into electrical energy and vice versa. These changes are known as a piezoelectric response and are used in a wide range of applications that include cell phones and heart implants.

More information: Luke Fleet. Ferroelectrics: Skyrmions all round, *Nature Physics* (2015). DOI: 10.1038/nphys3561

Y. Nahas et al. Discovery of stable skyrmionic state in ferroelectric nanocomposites, *Nature Communications* (2015). DOI: 10.1038/ncomms9542

Provided by University of Arkansas