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【664】Field-induced skyrmion inversion in the room-temperature chiral magnet Co9Zn9Mn2

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In a β-Mn-type chiral magnet Co9Zn9Mn2, we demonstrate the magnetic field-driven collapse of a room temperature metastable skyrmion lattice (SkL) to pass through a regime of partial topological charge inversion. Using Lorentz transmission electron microscopy, we observe the magnetization distribution directly as magnetic fields are applied antiparallel to the original skyrmion core magnetization. Topological protection prevents the transition of the SkL to the helical state, instead, for increasingly negative fields, the metastable SkL transforms into giant topological bubbles. These structures give way to form a near-homogeneously magnetized medium that hosts isolated skyrmions with inverted cores. From micromagnetic simulations, we find that the observed regime of partial topological charge inversion has its origin in the topological protection of the starting SkL.

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