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Abstract for an Invited Paper
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Creation and Dynamics of Individual Skyrmions in Helimagnets¹

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The physics and future applications of magnetic skyrmions in helimagnet have attracted great attentions in the past years. Now the major focus of this field is the ability of creating single skyrmions in a controlled manner, and exploring novel properties of skyrmions as quasi-particles. In this talk, I will introduce our recent work on creating a single skyrmion via electric current or geometric confinement. The time and position of the skyrmion can be accurately controlled. More importantly, the microscopic mechanism is clearly revealed by the analysis of the topological charge, which also explains the topological origin of the skyrmion stability for the first time. The distinct feature of the skyrmion is an emergent gauge field attached to it. The motion of a single skyrmion is realized by coupling this emergent gauge field to electric current or magnon current. I will show that an electric current or temperature gradient can result in a steady motion of a single skyrmion.

[1] Gen Yin, Yufan Li, Lingyao Kong, Roger Lake, C. L. Chien, and Jiadong Zang, submitted.

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[3] Lingyao Kong, and Jiadong Zang, Phys. Rev. Lett. 111, 067203 (2013).

[4] M. Mochizuki, X. Z. Yu, S. Seki, N. Kanazawa, W. Koshibae, J. Zang, M. Mostovoy, Y. Tokura, and N. Nagaosa, Nature Material 12, 241 (2014).

[5] Haifeng Du, *et al.* submitted.

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