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**Enhanced stability of skyrmions in magnets with broken mirror symmetry**[1] JAMES ROWLAND, Ohio State University, SUMILAN BANERJEE, Weizmann Institute of Science, MOHIT RANDERIA, Ohio State University — Most previous work on skyrmion phases in chiral magnets with Dzyaloshinkii Moriya interactions (DMI) focuses on the case of broken bulk inversion symmetry. The skyrmion crystal is then stable only in a limited range of parameter space with easy-axis anisotropy. In this talk I will describe the effects [1] of including broken mirror or surface inversion symmetry which leads to a Rashba DMI, in addition to the Dresselhaus DMI arising from broken bulk inversion. I will show that increasing Rashba DMI leads to a progressively larger domain of stability for skyrmions, especially in the easy-plane anisotropy regime. In the latter regime the topological charge density shows an unusual internal structure, and isolated skyrmions cannot be embedded in a ferromagnetic background. Thus the homotopy group $\pi_2(S^2)$ method of classifying skyrmions fails. I will discuss a Chern number classification of these non-trivial skyrmions using maps from the 2-torus (the unit cell for skyrmion crystals) to the 2-sphere in spin space. Finally, I will discuss the elliptic cone phase, a new state that emerges for easy-axis anisotropy and broken mirror symmetry. [1] J. Rowland, S. Banerjee, and M. Randeria, arXiv:1509.07508v2.

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