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Magnon-skyrmion interactions in collinear antiferromagnets¹ MATTHEW DANIELS, RAN CHENG, Carnegie Mellon University, JIANG XIAO, Fudan University, DI XIAO, Carnegie Mellon University — Due to their favorable material parameters and intruiging magnonic properties, AFM spin waves have recently become the subject of intense research. We investigate the interaction between AFM spin waves and skyrmion configurations of the AFM staggered order. By expressing the spin wave forces on the skyrmion in terms of semiclassical wavepacket theory, we find that the primary interaction takes the form of a Lorentz force, with the role of electronic charge played by the magnon chirality. We also find that, while magnons penetrate the skyrmion profile, they incur a reduction in the skyrmions inertial mass. Neglecting magnon-magnon interactions, we then integrate these equations of motion over wavepacket distributions to derive a spin wave current response formalism.

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