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Raman scattering from magnetic excitations in CrI3 atomic layers[1] ZHIPENG YE, POUYAN REZAIE, FABIAN DIAZ, SAAD SIDDIQ, ERIC ERIC, RUI HE, Texas Tech Univ, HYUN HO KIM, BOWEN YANG, ADAM TSEN, University of Waterloo, Canada, WENCAN JIN, SIWEN LI, LIUYAN ZHAO, University of Michigan — Two-dimensional (2D) magnetism has been long sought-after and only very recently realized in atomic crystals of magnetic van der Waals materials. So far, a comprehensive understanding of the magnetic excitations in such 2D magnets remains missing. Here we report polarized micro-Raman spectroscopy studies on a 2D honeycomb ferromagnetic CrI3. Two sets of magnetic excitations at frequencies of 76 and 125 cm-1 are observed in CrI3 atomic layers down to the monolayer limit. By tracking the thickness dependence of both modes from magnetic excitations, we reveal that both are surface modes. Our results demonstrate intriguing spin dynamics and intricate interplay with fluctuations in the 2D limit, thus opening up opportunities for spintronics applications incorporating 2D magnets.

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