Editors

Physical Review Letters

Dear Editors,

Attached please find a manuscript entitled “Topological magnons in a one-dimensional itinerant flat-band ferromagnet” by Xiao-Fei Su, Zhao-Long Gu, Zhao-Yang Dong and Jian-Xin Li, which is submitted for consideration to be published in “Physical Review Letters”.

Magnon bands with non-trivial topological structures have attracted much attention recently. Previous studies only focus on local spin systems where the linear spin wave theory applies, such as the pyrochlore ferromagnet and the Kagome ferromagnet Cu[1,3-bdc]. In such systems, the Dzyaloshinskii-Moriya (DM) interaction plays a central role in the generation of the non-trivial magnon bands. In this letter, we consider an alternative scenario-- the itinerant ferromagnets, and give an affirmative answer to a fundamental question that non-trivial topological magnons do exist in itinerant magnets. The model considered is a one-dimensional Tasaki model with a flat band, which can be viewed as a quarter-filled periodic Anderson model with impurities locating at the center of the bonds and hybridizing with electrons at their neighboring sites, together with a Hubbard repulsion for conducting electrons. We show that the gap between the acoustic and optical magnonic bands closes and reopens while the Berry phase of the acoustic band changes from 0 to *π* with the increasing of Hubbard interaction. At the same time, there always exist in-gap edge magnonic modes after this transition, which is consistent with the bulk-edge correspondence. Therefore, we establish a Hubbard interaction driven topological magnonic transition, and reveal a new platform to realize non-trivial magnon bands. To our knowledge, this is the first proposal of itinerant topological magnons, which will stimulate the related theoretical and experimental results.

Therefore, our work is timely and should attract much attention. We believe that it is suitable for a publication in “Physical Review Letters”.  Thanks in advance for your kind consideration.

Yours sincerely,

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