Magnonic transport of a ferromagnetic chain in the presence of long-range exchange interaction

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Abstract
In this paper, using Green's function approach, we study the magnon transport properties of a ferromagnetic chain connected to two semi-infinite ferromagnetic leads beyond the nearest neighbor approximation. For this purpose, we first linearize the dynamic relations of magnetic moments in the center wire. Then, by writing its Green's function in the presence of leads, we provide the relations for calculating the magnon transmission coefficient and density of states. We have performed our numerical calculations for a domain impurity and an atomic impurity that causes the beyond of the nearest neighbor approximation. From the obtained results, it can be pointed out that the width of the intensity region and the number of its peaks change with the change in magnetic properties of the impurity. Based on the present work, one may investigate the conduction control by changing the strengths of the exchange interaction coefficient and integral.

Keywords: Green's function, ferromagnetic, magnon transport, magnetic impurity

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