

# Manipulating magnon transport in magnetic materials

seminar

May 17, 2021 3:00 pm  
Zoom Lecture



## Abstract

Spin wave is considered as one of the promising candidates for realizing unconventional computing, interconnection and information processing. Compared with other forms of waves, spin wave has many unique features, including short wavelength, intrinsic nonlinearity, non-reciprocity, etc.

In this talk I will discuss some of our recent efforts in studying the transport properties of spin wave (or equivalently, magnons) in various magnetic structures. In the first example, I will show that there exist mutual interactions between magnons and magnetic domain walls in a ferromagnet, where domain walls change the phase and magnitude of spin waves, and a strong spin wave in turn moves the position of domain walls. This mutual interaction can be used to realize a programmable spin wave phase shifter.

In the second example, I will talk about long-range spin transport in an easy-plane antiferromagnet, where the spin angular momentum propagates via the superposition of two linearly polarized magnon modes. We show that the magnon transport in this antiferromagnet can be used to build a non-volatile spin current switch. These mechanisms and device structures could be used as building blocks for future magnon based information processing both in the classical and quantum domain.

## Speaker

Prof. Luqiao Liu  
Dept. of Electrical Engineering  
and Computer Science, MIT