SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
COLLEGE OF DESIGN AND ENGINEERING
Website: https://cde.nus.edu.sg/ece

Area: Microelectronic Technologies & Devices

Host: Associate Professor Liang Gengchiau

TOPIC	:	**Spatially Inhomogeneous Dynamics in Ferrimagnets Based on An Atomistic Model**
SPEAKER	:	**Ms. Cai Baofang** **Graduate Student, ECE Dept, NUS**
DATE	:	**Tuesday, 27 June 2023**
TIME	:	**3.30PM to 4.00PM**
VENUE	:	**Join Zoom Meeting:** **https://nus-sg.zoom.us/j/86242980204?pwd=L0NWQnVWcml5bE5kYmZybVRvcFdjdz09** **Meeting ID: 862 4298 0204** **Passcode: 151974**

ABSTRACT

Ferrimagnets (FiMs) could be operated at high frequency as antiferromagnets and being easy to detect as ferromagnets, paving a promising way for ultrafast device applications. So far, the dynamical behavior of FiMs near the compensation point has been widely studied, and a generic understanding of FiMs where the ratio of sublattice spins can vary freely between the ferromagnetic and antiferromagnetic limits was also reported. For the aforementioned issues, the widely used two-sublattice macro-magnetic model could clearly illustrate general physical properties of FiM system, showing that how static magnetic fields and current-induced torques could manipulate the two sublattices which stand for in FiM. However, sometimes describing FiM spin dynamics via only two approximated sublattices is rough, and therefore, it can neither accurately explains some experimental results nor capture sophisticated physical properties of FiM system.

Hence, we built up a non-uniform multi-sublattices in FiM system by using our self-made atomistic model to figure out some sophisticated and novel physical properties of the FiM system. We find out that in different sub-spin configurations, the threshold currents for oscillating or switching would be shifted. Furthermore, it is noteworthy that in the non-uniform multi-sublattice FiM system, the oscillation initiated from some special region with particular sub-spin configurations where we defined as “oscillation core”, and the oscillation region would extend from “oscillation core” to some specific region, until steady-state oscillation is formed. In this process, all sub-spins are not necessarily oscillating or switching, i.e., some of sub-spins could keep static all the time. This work will start from discussing 1D cases and then 2D cases. Our work not only reveals the novel understanding in ferrimagnetic spintronics, but also suggests material selecting and treating strategy for designing energy-effective and ultrafast spin nano oscillators.

BIOGRAPHY

Ms. Cai Baofang is currently pursuing a Ph.D. degree in the School of Electrical and Computer Engineering at NUS. Her supervisor is Prof. Liang Gengchiau. Her research focuses on exploring the novel properties of ferrimagnetic systems and corresponding device physics.