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Tetragonal Mn-based Heusler for ultra-high frequency spintronics

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Tetragonal Mn-based Heusler compounds, Mn-Ga binary [1,2] and Mn-Co-Ga ternary [3], have attracted attentions for nano-spintronics applications, such as spin-transfer-torque magnetic random access memory [4], since those have a small magnetization [5], large magnetic anisotropy [5], low-loss at high-frequency [6], and high-electronic spin polarization [7].

In this talk, we will focus on alternative tetragonal Mn-based Heusler compound, Mn₃Ge (Mn₂MnGe). The epitaxial films of Mn₃Ge exhibit the small magnetic moment and high magnetic anisotropy [8]. Recently we succeeded to grow the high-quality epitaxial films of Mn₃Ge that exhibited the well-squared hysteresis loop and large perpendicular magnetic anisotropy field of about 20 T, owing to a nearly-compensated ferrimagnetism and large uniaxial magnetic anisotropy [9,10]. This large effective field of Mn₃Ge increases low-energy magnon frequency up to THz-wave range, which makes it possible to realize spintronics devices working in THz-wave range. The research progress on the observation of spin dynamics in THz-wave range for this material using an optical method will be presented [11].

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All interested are cordially welcome!

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