

# Prof. M. Benjamin Jungfleisch

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**Friday, August 26, 11:00 am. Osborne A204**

## **Controlling THz spin dynamics in magnetic heterostructures**



Significant progress has been made in understanding how and on what time scales electrons, spins, and phonons interact in solid-state materials. These complex interactions led to the first real applications of terahertz (THz) spintronics: THz emitters that can compete with traditional THz sources and provide additional functionalities enabled by the spin degree of freedom [1].

In this talk, I will present recent advances in THz spintronics and discuss developments in this exciting field, including integrating novel material platforms such as topological insulators [2] and Rashba interfaces [4]. Magnetic heterostructures offer conceptual advantages as THz sources since the spin orientation in the magnetic layer can be easily controlled. I will demonstrate the manipulation of the THz properties in spintronic emitters either by the externally applied magnetic field or by the internal magnetic field distribution in micro-patterned samples [4,5].

This work was supported by the National Science Foundation under Grant No. 1833000 and the University of Delaware Research Foundation (UDRF). Additional support was received from the National Science Foundation through the University of Delaware Materials Research Science and Engineering Center, DMR-2011824.

**References:** [1] Wu et al., J. Appl. Phys. **130**, 091101 (2021), [2] Sharma et al., Phys. Rev. Materials **5**, 124410 (2021), [3] Jungfleisch et al., Phys. Rev. Lett. **120**, 207207 (2018), [4] Wu et al., J. Appl. Phys **128**, 103902 (2020), [5] Wu et al., Appl. Phys. Lett. **121**, 052401 (2022).

### **Short Bio**

M. Benjamin Jungfleisch is an Assistant Professor at the University of Delaware in the Department of Physics and Astronomy. His research interest is in a wide range of magnetism-related effects focusing on spin-transport phenomena and spin dynamics in nanostructures. He received the Department of Energy Early Career Research Award in 2019 and the National Science Foundation EPSCoR RII Track-4 Fellowship in 2018. Before joining the University of Delaware, he was a postdoctoral researcher at Argonne National Laboratory within the Materials Science Division. He received his Ph.D. in Physics at the University of Kaiserslautern in 2013 and an M.S. in Physics in 2009 from the same institution.