



# *Optical Characterization of Interface Magnetization in Multifunctional Oxide Heterostructure*

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## Abstract

Multifunctional oxides attract much attention recently. The strong correlated electron system involves the notable properties of colossal magnetoresistance, ferroelectric tunneling and spin transport, with the coupling of electron, spin and orbital degrees of freedom. Their rich functional behavior is of potential use for nanoelectronics and data storage. Particularly interesting are the multiferroic materials, which exhibit simultaneously electric and magnetic ordering properties. Understanding the interface coupling mechanism of these two order parameters are critical to future development of high-performance spintronic devices. The goal of this dissertation is to elucidate the interfacial magnetoelectric (ME) coupling with optical characterization method -- magnetization-induced second-harmonic generation (MSHG), which is sensitive to the interface due to the broken spatial inversion symmetry.