

物理工学談話会 12月3日 (火) 午後16:15~

会場：総合研究棟W701 世話人：レービガー ハンネス

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## Using DFT to Investigate the Magnetoelectric Coupling at Fe<sub>3</sub>Si/Tm/ BaTiO<sub>3</sub> (001) (TM = Sc to Cd) Interfaces

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The coupling of magnetic and ferroelectric properties at interfaces between ferromagnetic and ferroelectric materials has been studied due to the possibility of manipulate magnetic states by using lower energy-demanding electric field rather than its magnetic counterpart [1], which opens the possibility to reduce energy consumption in spintronics. Hence, we investigate by means of Density Functional Theory the magnetoelectric coupling (MEC) at the interface of multiferroic systems composed by 3d and 4d transition-metal (TM) monolayers sandwiched between Fe<sub>3</sub>Si(001) and BaTiO<sub>3</sub> (001), which are the ferromagnetic and ferroelectric phases, respectively. We report the values of their MEC coefficients and compare with similar multiferroic systems in literature [2]. We also present analysis of electronic properties that help us understand the mechanisms that drive the interfacial MEC.

[1] NA Spaldin, R Ramesh. Multiferroics: progress and prospects in thin films. *Nature Materials* 18, 203 (2018).

[2] C Duan, SS Jaswal, EY Tsybal. Predicted Magnetoelectric Effect in Fe/BaTiO<sub>3</sub> Multilayers: Ferroelectric Control of Magnetism.

*Physical Review Letters* 97, 047201, (2006).