

DF 12: PV XV - Dennis Meier

Time: Wednesday 13:15–13:45

Location: HSZ 01

Prize Talk

DF 12.1 Wed 13:15 HSZ 01

Functional domain walls in multiferroic oxides — •DENNIS MEIER — Department of Materials Science and Engineering, NTNU, Trondheim, Norway — Laureate of the Gustav-Hertz-Prize

Oxide materials exhibit a broad range of tunable phenomena, including magnetism, multiferroicity, and superconductivity. Oxide interfaces are particularly intriguing. The low local symmetry combined with the sensitivity to electrostatics and strain leads to unusual physical properties beyond the bulk properties. Recently, ferroelectric domain walls have attracted attention as a novel type of oxide interface. These walls are spatially mobile and can be created, moved, and erased on demand. The additional degree of flexibility enables domain walls to

take an active role in future devices and hold a great potential as multifunctional 2D systems for nanoelectronics.

In my talk I will discuss unique features that occur at ferroelectric domain walls in multiferroic oxides. In the first part, I will address geometrically driven charged domain walls in hexagonal manganites and show how their local electronic properties can be optimized and controlled. In the second part, I will consider domain walls in spin-spiral multiferroics with strong magnetoelectric couplings and additional functionality that arises from the interplay of charge and spin degrees of freedom. The goal is to provide insight into the exotic and fascinating physics at domain walls in multiferroics and their great application potential for next-generation devices.