Single Functional Domain Wall Physics and Engineering with 1D Wall Waveguide

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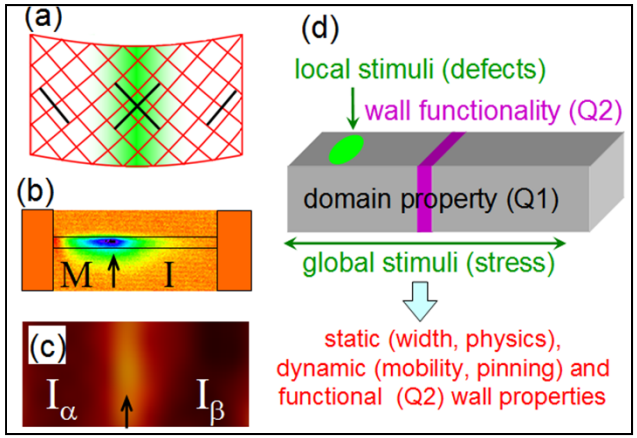

Research Program

- Objectives: understand and exploit novel physics and functionalities of ferroic domain walls by controlling them individually with defects and strain.
- Background: walls separating homophase or heterophase ferroic domains host emergent functionalities that are absent in the domains; they are also mobile, rewritable and low-dimensional. Examples include metal-insulator domain walls and ferroelastic twin walls in VO_2 and $W_xV_{1-x}O_2$, ferroelectric domain walls in $BiFeO_3$, etc.
- Approach: synthesize functional nanomaterials, stabilize domain walls, investigate single-wall physics and properties, and exploit them for device applications.

Collaborations

- Experimental: A. Minor, R. Ramesh, C. Grigoropoulos (Berkeley), M. Raschke (Colorado), R. Chen (UCSD), D. Yu (UCD), et al
- Theoretical: L. Q. Chen (PSU), J. Grossman (MIT), V. Eyert (Augsburg), et al