

# Special TEP Seminar

UCLA

*Wednesday, January 18 @ 11:00 AM*

*Physics & Astronomy Building (PAB) 4-330*

## Understanding Chiral Gauge Theories via Extra Dimensions

**Dorota Grabowska** (UC Berkeley)

I discuss a recent proposal for nonperturbatively regulating chiral gauge theories, a long-standing problem in quantum field theory that may have implications on Standard Model physics and beyond. Using the lattice as the regulator, the proposal involves coupling five-dimensional domain wall fermions to four-dimensional gauge fields that obey a gradient flow equation in the extra dimensions. In the limit of an infinite extra dimension, exactly massless modes are localized on the boundary of the space. Modes on one boundary couple in gauge fields in the conventional manner, while fermions on the other wall couple only to the gauge and possibly topological degrees of freedom of the gauge field. As these couplings may persist after renormalization, the mirror partners of Standard Model fermions may not simply be lattice artifacts, but actually be physically observable. After explaining the proposal, including the question of gauge anomalies, I touch briefly upon the possible phenomenological implications of these mirror partners.