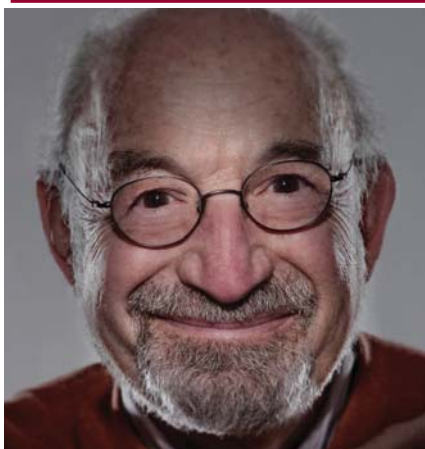


College of Arts and Sciences
Department of Mathematics
University of South Carolina

Math Colloquium

Discrete Scalar Quantum Field Theory

Stan Gudder, University of Denver



Thursday
December
7th

4:30 PM
LeConte 412

This talk is meant for a general audience and no prior knowledge of physics is required. We begin by assuming that spacetime is discrete and is described by a 4-dimensional cubic lattice. This implies that there are discrete sets of possible particle energies, momenta and masses. We then define discrete scalar quantum fields. These fields are employed to construct interaction Hamiltonians and scattering operators. Besides discreteness, our main assumption is conservation of energy-momentum for a scattering process. We conclude with various examples of perturbation approximations. These include simplified versions of electron-electron and electron-proton scattering as well as simple decay processes. We also define scattering cross-sections, decay rates and lifetimes within this formalism.