1092-37-343 **Stefan Müller***, Department of Mathematics, 1409 W Green Street, Urbana, IL 61801.

Topological Hamiltonian and contact dynamics.

In classical mechanics the dynamics of a Hamiltonian vector field model the motion of a particle in classical phase space, and the dynamics of a contact vector field play a similar role in geometric optics (in the mathematical model of Huygens' principle). Topological Hamiltonian dynamics and topological contact dynamics are recent theories that explore natural questions regarding the regularity of such dynamical systems. In a nutshell, they admit genuine generalizations to non-smooth dynamical systems with non-smooth generating (contact) Hamiltonian functions.

The talk begins with examples that illustrate the central ideas and lead naturally to the key definitions. The main technical ingredient is the well-known energy-capacity inequality for displaceable subsets of a symplectic manifold. We use it to prove an extension of the classical 1-1 correspondence between isotopies and their generating Hamiltonians. This crucial result turns out to be equivalent to certain rigidity phenomena for smooth Hamiltonian and contact dynamical systems. The rest of the talk addresses sample applications to topological dynamics and to Riemannian geometry. In particular, we prove a rigidity result for the geodesic flows associated to a uniformly weakly convergent sequence of Riemannian metrics. (Received August 13, 2013)