

GAUGE THEORY & TOPOLOGY SEMINAR

Vladimir Chernov

Causality, Low conjecture and the partial order on the space of Legendrian spheres

Let (X^{m+1}, g) be a globally hyperbolic spacetime with Cauchy surface diffeomorphic to an open subset of \mathbb{R}^m . The Legendrian Low conjecture formulated by Natário and Tod says that two events $x, y \in X$ are causally related if and only if the Legendrian link of spheres $\mathfrak{S}_x, \mathfrak{S}_y$ whose points are light geodesics passing through x and y is non-trivial in the contact manifold of all light geodesics in X . The Low conjecture says that for $m = 2$ the events x, y are causally related if and only if $\mathfrak{S}_x, \mathfrak{S}_y$ is non-trivial as a topological link. We prove the Low and the Legendrian Low conjectures. We also show that similar statements hold for any globally hyperbolic (X, g) such that the universal cover of its Cauchy surface is an open manifold. The conjecture follows from the existence of the natural partial order on the space of Legendrian spheres in the spherical cotangent bundle of such Cauchy surfaces. We also discuss related joint works with Yuli Rudyak.

Date: Friday, September 24

Time: 3:30-4:30

Location: Harvard Mathematics Department, Science Center 507

Contact: Andrew Cotton-Clay (acotton@math.harvard.edu)

<http://math.harvard.edu/~acotton/seminar.html>