1041-55-115   **Ralph L Cohen*** (`ralph@math.stanford.edu`), Dept. of Mathematics, Stanford University, Stanford, 94305. *Field Theories, String Topology, and Hochschild homology.*

I will begin by recalling the work of K. Costello on open-closed topological field theories. I will then describe work of myself, Andrew Blumberg, and Constantin Teleman, in which our goal is to show how string topology fits into this picture. Namely, let M be a closed oriented manifold and let $N \subset M$ be a closed submanifold whose inclusion is 1-connected. I will describe a calculation of the Hochschild cohomology of the chain algebra of paths in M starting and ending in N. The algebra structure is given by the open string topology operations of Sullivan, Harrelson, and Ramirez.

I will also discuss the following more categorical theorem. Let $C(M)$ be the A_∞- category whose objects are closed submanifolds of M (of any dimension), and whose morphisms between N_0 and N_1 are the chains of the space of paths in M that start in N_0 and end in N_1. Composition is again given by the open string topology operations. Then the Hochschild homology of this A_∞-category is the homology of the free loop space,

$$HH_*(C(M)) \cong H_*(LM).$$

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