

## **abstract**

Members Seminar

Topic:

Speaker:

Affiliation:

Date:

Time/Room:

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A metric on a compact manifold  $M$  gives rise to a length function on the free loop space  $LM$  whose critical points are the closed geodesics on  $M$  in the given metric. Morse theory gives a link between Hamiltonian dynamics and the topology of loop spaces, between iteration of closed geodesics and the algebraic structure given by the Chas-Sullivan product on the homology of  $LM$ . Geometry reveals the existence of a related product on the cohomology of  $LM$ .

A number of known results on the existence of closed geodesics are naturally expressed in terms of nilpotence of products. We use products to prove a resonance result for the loop homology of spheres.

I will not assume any prior knowledge of loop products.

Mark Goresky, Hans-Bert Rademacher, and (work in progress) Ralph Cohen and Nathalie Wahl are collaborators.