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Topology is hard, but group actions make it easier. In this talk, we will show how a Hamiltonian S^1 action on a symplectic manifold (with isolated fixed points) is just enough information to determine its S^1 -equivariant cohomology ring. The ring is generated by a classes associated to each fixed point. Understanding how these classes restrict to fixed points in equivariant cohomology is equivalent to understanding how to multiply in them in this special basis, though positivity is not translatable from one setting to the other.

We give a formula for the restriction of these classes to fixed points. This was done for the flag varieties, though our formula is different even in that case. Time permitting, I will talk about subtleties in the topology of these spaces, leading to several open questions. This is joint work with Susan Tolman at University of Illinois, Champaign-Urbana. (Received August 28, 2006)