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Title: Hamiltonian S^1 Actions with Isolated Fixed Points on 6-Dimensional Symplectic Manifolds

Abstract: The question of what conditions guarantee that a symplectic S^1 action is Hamiltonian has been studied for many years. In a 1998 paper, Sue Tolman and Jonathon Weitsman proved that if the action is semifree and has a non-empty set of isolated fixed points then the action is Hamiltonian. Furthermore, in a 2010 paper Cho, Hwang, and Suh proved in the 6-dimensional case that if we have $b_2^+ = 1$ at a reduced space at a regular level λ of the circle valued moment map, then the action is Hamiltonian. In this paper, we will use this to prove that certain 6-dimensional symplectic actions which are not semifree and have a non-empty set of isolated fixed points are Hamiltonian. In this case, the reduced spaces are 4-dimensional symplectic orbifolds, and we will resolve the orbifold singularities and use J-holomorphic curve techniques on the resolutions.