

Let (M, ω) be a two dimensional closed symplectic manifold. Then it is well-known that if M admits a symplectic circle action, then M is diffeomorphic to S^2 or $S^1 \times S^1$. For each case, any symplectic circle action on S^2 is always Hamiltonian and the first Chern class $c_1(S^2)$ is positively proportional to $[\omega]$, and any symplectic circle action on $S^1 \times S^1$ is non-Hamiltonian and $c_1(S^1 \times S^1) = 0$. For the case when (M, ω) is a symplectic surface with genus greater than one, $c_1(M)$ is negatively proportional to $[\omega]$. We extend this result to higher dimensional cases. More precisely, let (M, ω) be a closed symplectic manifold satisfying $c_1(M) = \lambda \cdot [\omega]$ for some real number $\lambda \in \mathbb{R}$. Then we prove that if (M, ω) admits a symplectic circle action, then $\lambda \geq 0$. We also prove that if the action is non-Hamiltonian, then λ should be 0. This work is a joint work with Yunhyung Cho and Min Kyu Kim.