

COHOMOLOGY $\mathbb{C}\mathbb{P}^n$ AND $\tilde{G}_2(\mathbb{R}^{2n-1})$

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ABSTRACT. Let the circle act effectively on a compact symplectic manifold (M, ω) with moment map ϕ . Assume that $H^{2i}(M; \mathbb{R}) = H^{2i}(\mathbb{C}\mathbb{P}^n; \mathbb{R})$ for all i (as groups), and assume that the fixed point set M^{S^1} has exactly two components. We prove that the integral cohomology ring and Chern classes of M are isomorphic to either those of $\mathbb{C}\mathbb{P}^n$ or to those of $\tilde{G}_2(\mathbb{R}^{2n-1})$, where $\tilde{G}_2(\mathbb{R}^{2n-1})$ denotes the Grassmannian of oriented 2 planes in \mathbb{R}^{2n-1} . We also prove that the circle representation at the fixed point components has only two possibilities: it is semifree in the first case and it has two distinct weights in the second case.