Abstract

The Dold manifold P (m, n) is the quotient of S m × CP n by the free involution that acts antipodally on the sphere S m and by complex conjugation on the complex projective space CP n . In the thesis, we investigate free actions of finite groups on products of Dold manifolds. We show that if a finite group G acts freely and mod 2 cohomologically trivially on a finite-dimensional CW-complex k Y homotopy equivalent to P (2m i , n i), then G □ = (Z 2) l for some l ≤ k. This i=1 is achieved by first proving a similar assertion for k Y S 2m i × CP n i . We also i=1 determine the possible mod 2 cohomology algebra of orbit spaces of arbitrary free involutions on Dold Manifolds, and give an application to Z 2 -equivariant maps from spheres to Dold manifolds. We also study free Z 2 and S 1 -actions on cohomology real and complex Milnor manifolds. A real Milnor manifold RH r,s is a non-singular hypersurface of degree (1, 1) in the product RP r × RP s . A complex Milnor manifold CH r,s is defined analogously. We compute the mod 2 cohomology algebra of the orbit space of an arbitrary free Z 2 and S 1 -action on a compact Hausdorff space with mod 2 cohomology algebra of a real or a complex Milnor manifold. As applications, we deduce some Borsuk-Ulam type results for equivariant maps between spheres and these spaces. For the complex case, we obtain a lower bound on the Schwarz genus, which further establishes the existence of coincidence points for maps from Milnor manifolds to the Euclidean plane.