

An International Conference to
Celebrate the Birthday of Shing-Tung Yau
August 27-September 1, 2008

CHIRAL EQUIVARIANT COHOMOLOGY OF SPHERES

Bong H. Lian
Brandeis University

Abstract: We discuss a new equivariant cohomology theory that takes values in a vertex algebra, and contains and generalizes the classical equivariant cohomology of a manifold with a Lie group action à la H. Cartan. We compute this cohomology for spheres and show that for any simple connected group G , there is a sphere with infinitely many actions of G which have distinct chiral equivariant cohomology, but identical classical equivariant cohomology. Unlike the classical case, the description of the chiral equivariant cohomology of spheres requires a substantial amount of new structural theory. This includes a quasi-conformal structure, equivariant homotopy invariance, and the values of this cohomology on homogeneous spaces. These results rely on crucial features of the underlying vertex algebra valued complex that have no classical analogues. The talk is based on joint work with A. Linshaw (UCSD) and B. Song (UCLA).