

BOSTON UNIVERSITY GEOMETRY AND PHYSICS SEMINAR

COHOMOLOGICAL VERTEX ALGEBRAS AND THEIR MODULES

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Abstract: We introduce a family of algebraic structures as a higher-dimensional generalization of vertex algebras, which we term cohomological vertex algebras. The ring of Laurent series underlying a vertex algebra is replaced by a ring modeling the cohomology of certain schemes, such as the formal punctured n -disk and the formal 1-disk with doubled origin. The latter scheme leads to the raviolo vertex algebras of Garner–Williams. We examine various interpretations of cohomological vertex algebras and define their modules in analogy to vertex algebras. One physical interpretation is in terms of holomorphic factorization algebras, with the modules corresponding to primary fields.

The most important kind of vertex algebra is the vertex operator algebra, which comes equipped with an appropriate action of the Virasoro algebra, the unique one-dimensional central extension of the Witt algebra (the Lie algebra of Laurent polynomial vector fields). We define an analogue of the Witt algebra appropriate for cohomological vertex algebras and classify the central elements in its universal central extension. With this, we can define a cohomological vertex operator algebra, allowing for the study of coinvariants on higher-dimensional complex manifolds and varieties.

See <http://math.bu.edu/research/geom/seminar.html> or contact Yu-Shen Lin (yslin@bu.edu) or Brian Williams (bwill22@bu.edu) for more information.