On Ruan's Cohomological Crepant Resolution Conjecture for the Complexified Bianchi orbifolds

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A Bianchi group is a discrete subgroup G of $PSL_2(K)$, where K is the field of complex numbers. It acts naturally on the complex hyperbolic three-space H^3_K, such that the quotient H^3_K/G is an algebraic variety with Gorenstein singularities. In the seminar I will report on a joint work with Alexander Rahm (University of Luxembourg), where we prove that the Chen-Ruan orbifold cohomology ring of the associated orbifold $[H^3_K/G]$ is isomorphic to the cohomology ring of any crepant resolution Y of H^3_K/G. To this aim, following the classical McKay correspondence, we establish a bijection between conjugacy classes of elements of finite order of $G \setminus \{1\}$ and exceptional prime divisors of Y.This result, together with the computation of certain Gromov-Witten invariants of Y, confirms the validity of Ruan's conjecture.