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**Jason R Elsinger\*** (jelsinger@shc.edu). *Quantum dimensions and fusion products for irreducible modules of orbifold lattice vertex algebras under an isometry of order two: a step toward the general case.*

Every isometry  $\sigma$  of a positive-definite even lattice  $Q$  can be lifted to an automorphism of the lattice vertex algebra  $V_Q$ . An important problem in vertex algebra theory and conformal field theory is to classify the representations of the  $\sigma$ -invariant subalgebra  $V_Q^\sigma$  of  $V_Q$ , known as an orbifold. It is a long-standing conjecture that all irreducible  $V_Q^\sigma$ -modules are obtained by restriction from twisted or untwisted  $V_Q$ -modules. Under certain assumptions, this conjecture has been proved recently in a series of papers by M. Miyamoto. In the case when  $\sigma$  is an isometry of  $Q$  of order two, we have classified and constructed all irreducible modules of the orbifold vertex algebra  $V_Q^\sigma$  and identified them as submodules of twisted or untwisted  $V_Q$ -modules. Here we calculate their quantum dimensions and fusion rules, and investigate the general order case. The example where  $Q$  is a direct sum of two copies of the root lattice  $A_2$  and  $\sigma$  is the permutation automorphism is presented in detail. (Received September 18, 2016)