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Orbifolds of lattice vertex algebras

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Abstract. To a positive-definite even lattice Q, one can associate the lattice vertex algebra V_Q, and any automorphism σ of Q lifts to an automorphism of V_Q. In this paper, we investigate the orbifold vertex algebra V_Q^σ, which consists of the elements of V_Q fixed under σ, in the case when σ has prime order. We describe explicitly the irreducible V_Q^σ-modules, compute their characters, and determine the modular transformations of characters. As an application, we find the asymptotic and quantum dimensions of all irreducible V_Q^σ-modules. We consider in detail the cases when the order of σ is 2 or 3, as well as the case of permutation orbifolds.

Keywords and phrases: regular vertex algebra, lattice vertex algebra, theta function, modular transformation, orbifold algebra, twisted module

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