

## 2d CFTs, Borcherds products and hyperbolization of affine Lie algebras (Kaiwen Sun)

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In 1983, Feigold and Frenkel posed a question about possible relations between affine Lie algebras, hyperbolic Kac–Moody algebras and Siegel modular forms. We give an automorphic answer to this question and its generalization. We classify hyperbolic Borcherds–Kac–Moody superalgebras whose super-denominators define reflective automorphic products of singular weight on lattices of type  $2U \oplus L$ . We prove that there are exactly 81 affine Lie algebras  $g$  which have nice extensions to hyperbolic BKM superalgebras for which the leading Fourier–Jacobi coefficients of super-denominators coincide with the denominators of  $g$ . We find that 69 of them appear in Schellekens’ list of semi-simple  $V_1$  structures of holomorphic CFT of central charge 24, while 8 of them correspond to the  $N = 1$  structures of holomorphic SCFT of central charge 12 composed of 24 chiral fermions. The 4 extra cases are related to the exceptional modular invariants from nontrivial automorphisms of fusion algebras. This is based on a joint work with Haowu Wang and Brandon Williams.