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## A Quadrillion Standard Models from F-theory

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We present an explicit construction of  $\mathcal{O}(10^{15})$  globally consistent string compactifications that realize the exact chiral spectrum of the Standard Model of particle physics with gauge coupling unification in the context of F-theory. Utilizing the power of algebraic geometry, all global consistency conditions can be reduced to a single criterion on the base of the underlying elliptically fibered Calabi–Yau fourfolds. For toric bases, this criterion only depends on an associated polytope and is satisfied for at least  $\mathcal{O}(10^{15})$  bases, each of which defines a distinct compactification.

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