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Daniel Allcock (allcock@math.utexas.edu), University of Texas, Department of Mathematics, Austin, TX 78712, **James A Carlson*** (carlson@claymath.org), Clay Mathematics Institute, One Bow Street, Cambridge, MA 02138, and **Domingo Toledo** (toledo@math.utah.edu), University of Utah, Department of Mathematics, Salt Lake City, UT 84112. *The Moduli Space of Cubic Threefolds as a Ball Quotient.*

It has long been known that the moduli space of cubic curves is the quotient of the unit disk by an arithmetic group, namely $PSL(2, Z)$. In [math.AG/0007048](#) it was shown that a similar result holds for the moduli space of cubic surface. It is the quotient of the unit ball in complex 4-space by a specific arithmetic group. We establish the analogous result for cubic threefolds. There is a moduli space $\widehat{\mathcal{M}}_s$ for cubic threefolds and an isomorphism with the quotient of the unit ball in complex 10-space by a specific arithmetic group. This moduli space is obtained by blowing up the locus of chordal cubics, forming the set of stable points with respect to a suitable linearization, and taking the GIT quotient. The chordal cubic is the secant variety of a rational normal curve in P^4 . The “new” points in the moduli space correspond to unordered twelve-tuples of points on the rational normal curve which are not too singular. (Received August 12, 2006)