

Non-simply laced Lie groups and half-hypermultiplets in F-theory

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In six-dimensional F-theory/Heterotic string theory, half-hypermultiplets arise only when they correspond to particular quaternionic Kähler symmetric spaces, which are mostly associated with the Freudenthal-Tits magic square. Motivated by the intriguing singularity structure previously found in such F-theory models with a gauge group $SU(6)$, $SO(12)$ or E_7 , we investigate, as the final magical example, an F-theory on an elliptic fibration over a Hirzebruch surface of the non-split I_6 type, in which the unbroken gauge symmetry is supposed to be $Sp(3)$. Rather unexpectedly, we find significant qualitative differences between the previous F-theory models associated with the magic square and the present case.

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