

## Mathieu Moonshine: Symmetry Surfing and Quarter BPS States at the Kummer Point

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The elliptic genus of K3 surfaces encrypts an intriguing connection between the sporadic group Mathieu 24 and non-linear sigma models on K3, dubbed “Mathieu Moonshine”. By restricting to Kummer K3 surfaces, which may be constructed as  $Z_2$  orbifolds of complex 2-tori with blown up singularities, it has been possible to devise a framework in which the concept of symmetry surfing can be explored and tested in a concrete way. This talk focusses on what has been learned so far that supports the symmetry surfing idea when lifting the Kummer construction to the level of conformal field theory, with particular emphasis on quarter BPS states. Some of these states enter the elliptic genus with opposite signs thus cancelling each other when counted by this index, yet they carry interesting information that should help understand Mathieu Moonshine.

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