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Modular symmetry and mass hierarchies

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We investigate mass hierarchies in models with modular flavor symmetries. Several key conclusions arise from the observation that the determinants of mass matrices are one-dimensional vector-valued modular forms. Under some fairly general assumptions, we demonstrate that achieving hierarchical fermion masses requires the VEV of the modulus to be located near one of the critical points in moduli space. We revisit the universal near-critical behavior around these points and classify the resulting mass hierarchies for them. Lastly, we comment on the importance of coefficients in the expansion of modular forms and propose the Flavor Moonshine Conjecture.

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