FLASY 2022 - 9th Workshop on Flavour Symmetries and Consequences in Accelerators and Cosmology

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## Fermion Mass Hierarchies and Modulus Stabilisation in Modular-Invariant Models of Flavour

Tuesday 28 June 2022 11:00 (30 minutes)

In modular-invariant models of flavour, hierarchical fermion mass matrices may arise solely due to the proximity of the modulus  $\tau$  to a point of residual symmetry. This mechanism does not require flavon fields and may produce viable fermion (charged-lepton and quark) mass hierarchies without fine-tuning. Models of lepton flavour in which the indicated idea is realised are presented. The problem of modulus stabilisation in the framework of the modular symmetry approach to the flavour problem is discussed as well. By analysing simple UV-motivated CP-invariant potentials for the modulus  $\tau$  it is shown that a class of these potentials has (non-fine-tuned) CP-breaking minima in the vicinity of the point of residual  $Z_3^{ST}$ symmetry,  $\tau\simeq e^{i2\pi/3}.$  Stabilising the modulus at these novel minima breaks spontaneously the CP symmetry and can naturally explain the mass hierarchies of charged leptons and possibly of quarks.

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