

Contribution ID: **49** Type: **Poster**

A new five-texture-zero solution for Hermitian quark mass matrices with updated flavor data

In the Standard Model, the flavor puzzle arises from arbitrary Yukawa couplings that provide no dynamical explanation for the mass hierarchy, mixing angles, or CP violation. Texture zeros in Hermitian mass matrices provide a highly effective phenomenological ansatz to reduce the number of free parameters and establish predictive relationships. Through Weak Basis Transformations (WBT), up to three zeros can be structural, whereas the introduction of additional zeros imposes constraints with testable physical content.

Although four viable five-texture-zero configurations are known in the literature, the increasing precision of experimental data demands a re-evaluation. In this work, we exhaustively explore this parameter space using updated flavor data and report a new five-texture-zero class that is not permutation-equivalent to previously identified solutions. Through a numerical fit, we evaluate the candidate matrices by requiring them to simultaneously reproduce the six quark masses and the four Wolfenstein parameters (λ, A, $\bar{\rho}$, $\bar{\eta}$) with pulls below 1σ. By satisfying this criterion, the new pattern is established as a viable solution to derive analytical relationships and predictions in the quark sector.

Academic position of the presenting author

Undergraduate Student

Primary author: GUARANGUAY PINCHAO, Leonardo (Universidad de Nariño)

Presenter: GUARANGUAY PINCHAO, Leonardo (Universidad de Nariño)

Session Classification: Posters & Empanadas

Track Classification: Flavor physics and CP violation