

## Right unitarity triangles and tri-bimaximal mixing from discrete symmetries and unification

We propose new classes of models which predict both tri-bimaximal lepton mixing and a right-angled Cabibbo-Kobayashi-Maskawa (CKM) unitarity triangle,  $\alpha$  approximately 90 degrees. The ingredients of the models include a supersymmetric (SUSY) unified gauge group such as SU(5), a discrete family symmetry such as A4 or S4, a shaping symmetry including products of Z2 and Z4 groups as well as spontaneous CP violation. We show how the vacuum alignment in such models allows a simple explanation of  $\alpha$  approximately 90 degrees by a combination of purely real or purely imaginary vacuum expectation values (vevs) of the flavons responsible for family symmetry breaking.

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