

Extending Early High Energy Physics Studies with a Tri-Preon Model

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Abstract : Introductory courses in High Energy Physics (HEP) can be extended with the Tri-Preon (TP) model to both supplement and challenge the Standard Model (SM) theory. TP supplements by simplifying the tracking of Conserved Quantum Numbers at an interaction vertex, e.g., the lepton number can be seen as a di-preon current. TP challenges by proposing extended particle families to three generations of particle triplets for leptons, quarks, and weak bosons. There are extensive examples discussed at an introductory level in six arXiv publications, including supersymmetry, hyper color, and the Higgs. Interesting exercises include pion decay, kaon-antikaon mixing, neutrino oscillations, and K^+ decay to muons. It is a revealing exercise for students to weigh the pros and cons of parallel theories at an early stage in their HEP journey.

Keywords : HEP, particle physics, standard model, Tri-Preon model

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