



LABORATORY FOR ELEMENTARY-PARTICLE PHYSICS (LEPP)

LEPP Joint Seminar

Jim Talbert

DESY



Leptoquarks, residual flavour symmetries, and anomalous B-decays: a (roughly) model-independent approach to R_K^* and fermionic mixing.

Motivated by potential signals of lepton non-universality (LNU) in the B-decay observables R_K^* , I will augment the Standard Model (SM) Lagrangian with a single leptoquark and study its natural invariance under global Abelian flavour symmetries. Such symmetries, assumed to be the 'residual' subgroups of a (broken) ultra-violet flavour theory, have previously been utilized to predict the fermionic mixing angles of the SM. After briefly reviewing this mechanism, I will then focus on their effect in the novel Yukawa couplings sourced by the leptoquark. Upon considering all relevant flavour data, including global fits to the CKM and PMNS mixing matrices, I will show that the residual symmetries force the (quark-lepton) Yukawa couplings of the (scalar and vector) SU(2) triplet and (vector) SU(2) singlet leptoquarks into 12-13 highly predictive patterns. In addition to discussing the associated phenomenology, I will also show how proton decay is avoided without additional ad-hoc model building in this framework. Finally, I will briefly demonstrate how one can use experimental data to 'reconstruct' a parent non-Abelian flavour symmetry from the residual subgroups, thereby pointing to a UV model that can explain both LNU in B-decays and (portions of) the SM flavour puzzle.

Friday, September 21, 2018

12:30pm

301 Physical Sciences Bldg.

