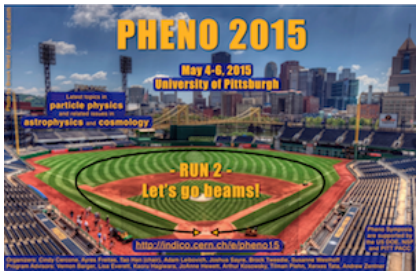

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Simultaneous Explanation of the R_K and $R(D^{(*)})$ Puzzles

Tuesday 5 May 2015 17:15 (15 minutes)

At present, there are several hints of lepton flavor non-universality. The LHCb Collaboration has measured $R_K \equiv B(B^+ \to K^{+}\ell^+\ell^-)/B(B^+ \to K^+ e^+ e^-)$, and the BaBar Collaboration has measured $R(D^{(*)}) \equiv B(\bar{B} \to D^{(*)+}\tau^-)/B(\bar{B} \to D^{(*)+}\ell^-)$ $(\ell = e, \mu)$. In all cases, the experimental results differ from the standard model predictions by 2-3. Recently, an explanation of the R_K puzzle was proposed in which new physics (NP) generates a neutral-current operator involving only third-generation particles. Now, assuming the scale of NP is much larger than the weak scale, this NP operator must be made invariant under the full $SU(3)_C \times SU(2)_L \times U(1)_Y$ gauge group. In this Letter, we note that, when this is done, a new charged-current operator can appear, and this can explain the $R(D^{(*)})$ puzzle. A more precise measurement of the double ratio $R(D)/R(D^{(*)})$ can rule out this model.

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