



Contribution ID: 76

Type: **parallel talk**

The shape of new physics in rare B decays

Tuesday 5 May 2015 16:45 (15 minutes)

Flavor physics offers a formidable window into new physics. In particular rare B-meson decays have received a great share of attention due to recent anomalous measurements. The customary Effective Field Theory scheme parametrizes deviations from the Standard Theory at the B meson scale with operators invariant under electro-magnetism and the strong interactions. However, if the scale of new physics lies above the electro-weak scale, the customary operators must originate from electro-weak invariant ones. This implies a sizable simplification of the analysis via a reduction of the independent operators.

On the other hand, one of the most prominent anomalies is the measured ratio of the decays of a B meson to a kaon, a muon and an anti-muon vs a kaon, an electron and a positron. This ratio differs from one, hinting at lepton universality violation. This is a rather unexpected result, specially in the present absence of lepton flavor violation. We will explore the naturalness of the former without the latter both in an EFT and with a specific model.

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Session Classification: B Physics