Contribution ID: **135** Type: **not specified**

Chiral-Scale Perturbation Theory and the Renormalization Group

Thursday 1 September 2016 15:00 (30 minutes)

Three-flavor chiral perturbation theory with t, b, c quarks decoupled tests the infrared limit of three-flavor QCD. The standard theory $\chi\mathrm{PT}_3$ (before being unitarized) assumes that there is no infrared fixed point α_{IR}. If α_{IR} exists, we get chiral-scale perturbation theory $\chi\mathrm{PT}_\sigma$ about a scale-invariant theory where the quark condensate is also a scale condensate with nine Nambu-Goldstone (NG) bosons: a massless 0^{++} dilaton σ ($f_0(500)$ in the real world) as well as π, K, η. The effective Lagrangian for $\chi\mathrm{PT}_\sigma$ is the standard one modified by σ-dependent terms and factors required to give the correct scaling dimensions, and can be systematically extended to include higher-order and electroweak corrections. The most important result is a neat explanation of the $\Delta I = 1/2$ puzzle for kaon decays; we propose to test it on the lattice via $K \to \pi$ with both on shell.

Summary

Primary author: TUNSTALL, Lewis (University of Bern)

Co-author: Dr CREWTHER, Rod (The University of Adelaide)

Presenter: TUNSTALL, Lewis (University of Bern)

Session Classification: Section B

Track Classification: Section B: Light Quarks