2nd Winter Institute 2019: B Physics Anomalies and Neutrino Mass Models

Report of Contributions

Contribution ID: **5**   Type: **not specified**

Some new ideas in Leptogenesis and Dark Matter studies

Wednesday, 27 November 2019 11:00 (1 hour)

An updated review is presented of the theory of low-energy antikaon and hyperon interactions with nucleons and nuclear systems. Applications include kaonic hydrogen, recent calculations of kaonic deuterium and comparisons with K-p correlation functions from ALICE at LHC. This is followed by a discussion of the possible role played by kaons and hyperons in dense baryonic matter, with special emphasis on constraints provided by the existence of two-solar-mass neutron stars and garvitational wave signals of neutron star mergers.

Presenter: SAMANTA, Rome (Southampton Univ)

Contribution ID: **6**   Type: **not specified**

Asymptotic safety with N_F flavors

Wednesday, 27 November 2019 14:30 (1 hour)

I will discuss recent developments in calculating beta functions of a generic gauge-Yukawa theory augmented by N_F flavors of heavy vector-like fermions. In the limit of large N_F it is possible to reorder the perturbative expansion with 1/N_F as ordering parameter, and then resum the tower of loop diagrams with ever-increasing number of vacuum-polarization bubbles at the leading order in 1/N_F. The resummed expression is finite and presents a pole at a non-perturbatively large value of the coupling. When applied to the gauge beta function, this mechanism can allow one to generate an interacting UV fixed-point and, for gauge symmetry groups not containing an abelian component, give rise to an asymptotically safe theory. Some possible applications of these constructions might pertain to flavor model building.

Presenter: SESSOLO, Enrico Maria (NCBJ Warsaw)

Contribution ID: **8**   Type: **not specified**

Global fits to ⊠→⊠⊠ transitions

Wednesday, 27 November 2019 12:00 (1 hour)

We perform a general model-independent analysis of $b \to c\tau\bar{\nu}_\tau$ transitions, including measurements of $\mathcal{R}_D$, $\mathcal{R}_{D^*}$, their $q2$ differential distributions, the recently measured longitudinal D^* polarization $F_L^{D^*}$, and constraints from the $B_c \to \tau\bar{\nu}_\tau$ lifetime, each of which has significant impact on the fit. A global fit to a general set of Wilson coefficients of an effective low-energy Hamiltonian is presented, the solutions of which are interpreted in terms of hypothetical new-physics mediators. From the obtained results we predict selected $b \to c\tau\bar{\nu}_\tau$ observables, such as the baryonic transition $\Lambda_b \to \Lambda_c \tau\bar{\nu}_\tau$, the ratio $\mathcal{R}_{J/\psi}$, the forward-backward asymmetries $cal A_{\mathrm{FB}}^{D^{(*)}}$, the τ polarization asymmetries $\mathcal{P}_\tau^{D^{(*)}}$, and the longitudinal D^* polarization fraction $F_L^{D^*}$. The latter shows presently a slight tension with any new-physics model, such that an improved measurement could have an important impact.

Presenter: PEÑUELAS, Ana (U. Valencia, IFIC)