

10th Edition of the Large Hadron Collider Physics Conference



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Type: Theory poster

Intrinsic quantum mechanics behind the Standard Model? - predictions in the baryon and Higgs sectors

Tuesday, 17 May 2022 19:00 (1 hour)

I introduce quantum mechanics on an intrinsic configuration space for baryons, the Lie group $U(3)$, which carries the three gauge groups of the standard model of particle physics as subgroups $SU(3)$, $SU(2)$ and $U(1)$. The strong and electroweak interactions become related via the Higgs mechanism. I namely settle the electroweak energy scale by the neutron to proton decay where both sectors are involved through quark flavour changes. Predictions of neutral pentaquark resonances reachable at LHCb follow in the baryon sector as does an accurate expression in the electroweak sector for the Higgs mass (yielding 125.095(14) GeV) and predictions on the couplings of the Higgs to itself and to the gauge bosons with signal strengths deviating by the presence of the up-down quark mixing matrix element. The intrinsic view means that quantum fields are generated by the momentum form on intrinsic wavefunctions and local gauge transformations in laboratory space equate translations in the intrinsic configuration space which may be likened to a generalised spin space. Further insight is gained for the Cabibbo and Weinberg angles expressed in traces of u and d flavour quark generators.

Key references:

EPL 102 (2013) 42002, Int. J. Mod. Phys. A 30 (2015) 1550078, EPL 124 (2018) 31001, EPL 125 (2019) 41001, EPL 133 (2021) 31001. See also arXiv:2007.02936.

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