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Neutron to proton mass difference, parton distribution functions and baryon resonances from dynamics on the Lie group $u(3)$

Ole L. Trinhammer.
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Abstract
We present a hamiltonian structure on the Lie group $u(3)$ to describe the baryon spectrum. The ground state is identified with the proton. From this single fit we calculate approximately the relative neutron to proton mass shift to within half a percentage of the experimental value. From the same fit we calculate the neutron and delta resonance spectrum. For specific spin eigenfunctions we calculate the delta to nucleon mass ratio to within one percent.

We derive parton distribution functions. The distributions are generated by projecting the proton state to space via the exterior derivative on $u(3)$. We predict scarce neutral-flavour singlets which should be visible in neutron diffraction dissociation experiments or in invariant mass spectra of protons and negative pions in B-decays and in photoproduction on neutron.

The presence of such single states distinguishes experimentally the present model from the standard model as does the prediction of the neutron to proton mass splitting. Conceptually the hamiltonian may describe an effective phenomenology or more radically describe ultra-dynamics implying sparks and quasis as projections from $u(3)$ which we then call allopaspace.

The allopaspace hypothesis
The Laplacian in (1) or (3) may be seen as an effective phenomenology or interpreted more radically in a conceptual interpretation where we see the allospatial hypothesis in (1) or (3) may be seen as an effective phenomenology or interpreted more radically in a conceptual interpretation where we see

The theory unfolded

The Schrödinger equation describe the baryon spectrum with

where $\theta$ are the eigenvalues of $\Delta$ and $\Psi$ is the configuration space containing both $su(3)$ and $u(1)$. Thus we choose the Lie group $u(3)$ as configuration space.

We boost a proton from rest to energy $E$ by impacting upon it a massless four-vector $\tau$.

We interpret the period doublings as related to the creation of a new resonance from a parton.

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Conclusions

We project from a state constructed from integral functions to mimic the period doublings implied in the decay to the proton state.

We scale the boost with different period doublings in the decay to the proton state.

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Parton distributions

We boost a proton from rest to energy $E$ by impacting upon it a massless four-vector $\tau$.

The black dots in the figures show the Bloch wave number choices for the neutron (left) and the proton (right).

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