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

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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 nucleon 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. The potential is half the squared geodetic distance from the point alleged N-states and approximate solutions for both alleged N-states and the proton. From this single fit we calculate approximately the relative neutron to proton mass shift to within half a percentage. We derive parton distribution functions. The distributions are generated by projecting the proton state to space via the exterior derivative. This projection has shown to yield parton distribution functions that compares rather well with those of the proton valence quark distributions already in a first order approximation. A kinematic parametrization for the projection gives a natural transition between a confinement domain where the dynamics unfolds in the global group space and an asymptotic free domain where the algebra approximates the group. A promising ratio between the A(2520) and A(2380) masses has been calculated based on specific QCD-function. We expect the allopseudo energy eigenvalues to mimic the period doublings of specific spin and parity via expansions on specific combinations of O-functions. Single neutral flavour resonances are predicted above the free chern threshold of \( l(5410) \).

Conclusions
The allopseudo Hamiltonian in (1) or (2) may be seen as an effective phenomenology or interpreted more radically in a conceptual interpretation where we see

Resonances - from space: The impact momentum and strangeness operators generate the maximal torus of U(3).

Decay, fragmentation, confinement - from allopseudo: The momentum form quark spin at field.

The Hamiltonian has no fitting parameters except the scale \( \mu \).

A quite accurate prediction of the relative neutron to proton mass shift of 0.138% follows from approximate solutions to the Schrödinger equation. A projection of states to space is given via the exterior derivative. This projection has shown to yield parton distribution functions that compares rather well with those of the proton valence quark distributions already in a first order approximation. A kinematic parametrization for the projection gives a natural transition between a confinement domain where the dynamics unfolds in the global group space and an asymptotic free domain where the algebra approximates the group. A promising ratio between the A(2520) and A(2380) masses has been calculated based on specific QCD-function. We expect the allopseudo energy eigenvalues to mimic the period doublings of specific spin and parity via expansions on specific combinations of O-functions. Single neutral flavour resonances are predicted above the free chern threshold of \( l(5410) \).

The allopseudo hypothesis

The Laplacian in (1) admits off-diagonal derivatives which are represented by the off-diagonal Gell-Mann matrices. We choose three of those to represent spin and group them into \( u_{ij} \). This interpretation is supported by their commutation relations as body fixed angular momentum. The relation between space and allopseudo is like the relation in numbers between normal and quasi normal dynamics. The model has no fitting parameters except the scale \( \mu \). We find exact solutions for three even labels give possibilities of double charges which approximate the group. A promising ratio between the A(2520) and A(2380) masses has been calculated based on specific QCD-function. We expect the allopseudo energy eigenvalues to mimic the period doublings of specific spin and parity via expansions on specific combinations of O-functions. Single neutral flavour resonances are predicted above the free chern threshold of \( l(5410) \).

The theory unfolded

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Periodic potential and reduced zone scheme

Approximate energy levels for baryonic states are found by combinations of three parameters: eigenvalues of the three torus angles. These eigenvalues originally have the same periodicity as the parameter \( z \). However a coupled period doubling can decrease the total energy.

Parton distributions

We interpret the period doublings as related to the creation of the proton charge in the neutron decay. Similar states all the states may contribute to neutral states. A kinematic parametrization for the projection gives a natural transition between a confinement domain where the dynamics unfolds in the global group space and an asymptotic free domain where the algebra approximates the group. A promising ratio between the A(2520) and A(2380) masses has been calculated based on specific QCD-function. We expect the allopseudo energy eigenvalues to mimic the period doublings of specific spin and parity via expansions on specific combinations of O-functions. Single neutral flavour resonances are predicted above the free chern threshold of \( l(5410) \).

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