Oscillatory modes of quarks in baryons for 3 quark flavors u, d, s
Tuning to harmonic numbers of oscimodes of baryons

Peter Minkowski\textsuperscript{1,3a} and Sonia Kabana\textsuperscript{2b}

\textsuperscript{1} Albert Einstein Center for Fundamental Physics - ITP, University of Bern, Switzerland
Abstract

The present notes prepare the count of 'oscillatory modes of $N_f = 3$ light quarks', – u, d, s –, using the $\text{SU}(2 N_f^3 = 6) \times \text{SO}(3)$ broken symmetry classification, extended to the harmonic oscillator symmetry of 3 paired oscillator modes. $\mathcal{L} = \sum_{n=1}^{N_f} \vec{l}_n$ stands for the space rotation group generated by the sum of the 3 individual angular momenta of quarks in their c.m. system. The motivation arises from modeling the yields of hadrons in heavy ion collisions at RHIC and LHC, necessitating at the respective highest c.m. energies per nucleon pairs an increase of heavy hadron resonances relative to e.g. SPS energies, whence the included hadrons are treated as a noninteracting gas.

© Owned by the authors, published by EDP Sciences, 2014

This is an Open Access article distributed under the terms of the Creative Commons Attribution License 2.0, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.
Quark Model. 3 Flavours u, d, s. Mesons. Pseudoscalar and vector mesons. n\textsubscript{i} number of \textit{i} quarks. Isospin works well.

Nuclear ManadsPsaertsicleoPfhyusicas nd d quarkFraanrz eMuahlemimost equal. 2. Isospin Conservation. Conservation Law. Isospin I is conserved in strong interactions Allows to calculate ratios of cross sections and branching fractions in strong interactions. Delta(1232) Resonance. Mass 1232 MeV Width 120 MeV. Hyperon - baryon with at least one s quark Quark model predicted existence and mass Missing member of baryon decuplet JP = 3/2+. discovered 1964 at Brookhaven K- beam onto hydrogen target Bubble Chamber detector. K − + p → Ω + K − + K 0. Tuning to harmonic numbers of oscimodes of baryons. Peter Minkowski1,3a and Sonia Kabana2b. The present notes prepare the countin of 'oscillatory modes of N fl = 3 light quarks', \textit{u}, \textit{d}, \textit{s} –, using the broken symmetry classification, extended to the harmonic oscillator symmetry of 3 paired oscillator modes. stands for the space rotation group generated by the sum of the 3 individual angular momenta of quarks in their c.m. system. The motivation arises from modeling the yields of hadrons in heavy ion collisions at RHIC and LHC, necessitating at the respective highest c.m. energies per nucleon pairs an increase of heavy hadron resonances relative to e.g. SPS energies, whence the inclu