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## Neutron resonances in the Constituent Quark Model

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Measurements of the neutron cross-sections of heavy nuclei and their analysis at the IAE and ITEP, carried out in the 1950s and later, made it possible to find out deviations from the statistical model in the distributions of positions and spacings of neutron resonance levels. This work is a review of the analysis of the energies of nuclear states and the particle mass spectrum, based on the distinguished role of the electron, its symmetry, and radiative correction. A symmetry motivated approach to the problem of the particle mass spectrum is due to the fact that the electron and nucleons add up to the visible mass of the Universe, and the ratio of their masses is very accurately estimated in the CODATA review as  $m_n/m_e = 1838.6836605(11)$ . The representation of the nucleon masses in terms of the electron mass and the period  $16m_e = \delta$  allows checking the same representation in the discreteness effect in the energies of nuclear states and the masses of other particles. The values of the pion parameters  $f_\pi = 130$  MeV,  $m_\pi = 140$  MeV and  $\Delta M_\Delta = 147$  MeV, as well as the parameters of the Constituent Quark Model  $M_q = 3\Delta M_\Delta = 441$  MeV and  $M_q^\omega = 3f_\pi = 391$  MeV contain a general empirical discreteness parameter - the period  $\delta$ .

1. Sukhoruchkin S.I. et al. Proc. ISINN-28. JINR E3-2021, P. 234, 247, 259.
2. Sukhoruchkin S.I. Nucl. Part. Phys. Proc. 2021. V. 312 - 317. P. 185.
3. Sukhoruchkin S.I. Nucl. Part. Phys. Proc. 2022. V. 318 - 323. P. 191.

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