STRANGE AND CHARMED LIGHT HYPERNUCLEI AS CHIRAL SOLITONS.

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One of predictions of the chiral soliton models - the Skyrme model and its extensions - is that of existence of multibaryons with flavor different from u and d: strangeness, charm or beauty [1, 2, 3] . An additional asuumption is that some of baryonic systems with strangeness, obtained within the chiral soliton approach by means of quantization of $SU(2)$ bound skyrmions in $SU(3)$ configuration space, can be identified with known hypernuclei. The difference of binding energies of hypernuclei and ordinary nuclei is free of many uncertaincies intrinsic to this approach, because the poorly known contributions of nonzero modes, loop corrections or Casimir energy are cancelled in these differences. There is general qualitative agreement in the behaviour of binding energy of strange multibaryons and known hypernuclei for baryon number up to ~ 16. In the case of the $B = 4$ system (isodoublet ${}^4H_\Lambda$ and ${}^4He_\Lambda$) and $B = 7$ (hypernucleus ${}^7Li_\Lambda$) there is even quantitative agreement [4, 5, 6] within few Mev. Not perfect, but satisfactory agreement takes place also for ${}^5He_\Lambda$, ${}^8Be_\Lambda$, ${}^{12}C_\Lambda$ and in other cases. This allows to make a conclusion that predictions, in the framework of the chiral soliton approach, of charmed or beauty hypernuclei to be stable with respect to strong interactions beginning with $B = 4$, can be quite reliable. The searches for states with charm $c = 1$ and $c = 2$ will be possible in experiments on Japan Hadron Facility.

References

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