Contribution ID: **70** Type: **not specified**

Octet baryon masses in covariant baryon chiral perturbation theory

Sunday, 27 October 2013 17:40 (20 minutes)

We have performed a comprehensive study of the lowest-lying octet baryon masses and sigma terms in the covariant baryon chiral perturbation theory (BChPT) with the extended-on-mass-shell (EOMS) renormalization scheme up to next-to-next-to-next-to-leading order (N3LO). We fix the relevant low-energy constants by a simultaneous fit of all the publicly available LQCD data. Finite volume and discretization effects on the LQCD simulations are taken into account self-consistently. Our main results are
(1)The N3LO EOMS BChPT can give a reasonable description of the LQCD data with a $\chi 2$/d.o.f. = 1.0 and the various lattice simulations seem to be consistent with each other.
(2) The predicted values of the pion- and strangeness-nucleon sigma terms are $\sigma\pi N$ = 43(1)(6) MeV and σsN = 126(24)(54) MeV, respectively.
(3) The virtual decuplet effects on the baryon masses cannot be distinguished from those of the virtual octet baryons and the tree level diagrams.
(4) The finite-volume corrections to the octet baryon masses are important and can be useful to help constrain some relevant low-energy constants.
(5) Up to O(a2), the discretization effects on the LQCD baryon masses are shown to be small and can be safely ignored.

Primary author: Mr REN, Xiulei (School of Physics and Nuclear Energy Engineering, Beihang University)

Presenter: Mr REN, Xiulei (School of Physics and Nuclear Energy Engineering, Beihang University)

Track Classification: Parellel A