

On finite volume effects in the chiral extrapolation of baryon masses

Dienstag, 16. September 2014 11:00 (30 Minuten)

We perform an analysis of the QCD lattice data on the baryon octet and decuplet masses based on the relativistic chiral Lagrangian. The baryon self energies are computed in a finite volume at next-to-next-to-next-to leading order ($N^3\text{LO}$), where the dependence on the physical meson and baryon masses is kept.

The number of free parameters

is reduced significantly down to 12 by relying on large- N_c sum rules.

Altogether we describe accurately more than 220 data points from six different lattice groups, BMW, PACS-CS, HSC, LHPC,

QCDSF-UKQCD and NPLQCD. Values for all counter terms relevant at $N^3\text{LO}$ are predicted.

In particular we extract a pion-nucleon sigma term of 39^{+2}_{-1} MeV and a strangeness sigma term of the nucleon of

$\sigma_{sN} = 84^{+28}_{-4}$ MeV. The flavour SU(3) chiral limit of the baryon octet and decuplet masses is determined with (802 ± 4) MeV and (1103 ± 6) MeV. Detailed predictions for the baryon masses as currently evaluated by the ETM lattice QCD group are made

Hauptautor: Prof. LUTZ, Matthias F.M. (GSI)

Vortragende(r): Prof. LUTZ, Matthias F.M. (GSI)