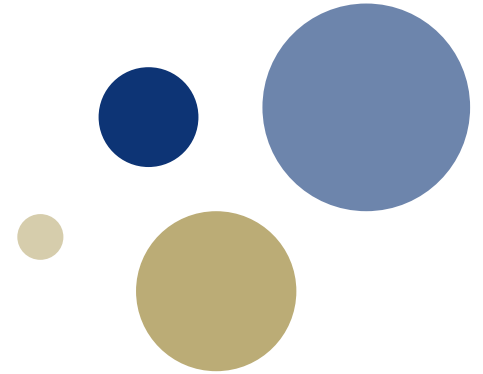




NTNU

Kunnskap for en bedre verden



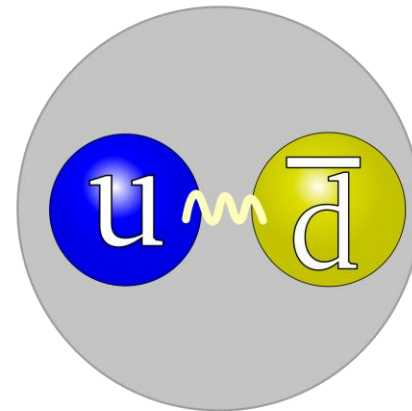
Two-flavor chiral perturbation theory at nonzero isospin

Student: Martin Mojahed

Supervisor: Professor Jens Oluf Andersen

Motivation

- Chiral perturbation theory (ChPT) is the effective field theory (EFT) of the Standard Model/strong interactions at low energies.



- In our case: Pions and nucleons instead of the more fundamental quarks and gluons of QCD.
- There exists a regime where both fundamental and effective theories yield the same results.

What I have done

- Explored the consequences of choosing an incorrect approach.
- Calculated quantum corrections to thermodynamical quantities.

4	A lowest order calculation of the pion mass	
4.1	The self-energy to one loop	
4.2	Mass renormalization	
5	An incorrect parametrization of the Goldstone manifold	
5.1	Rotating the vacuum	
5.2	Rotating the generators	
5.3	The pion propagator	
5.4	Free energy and renormalization	
5.4.1	Renormalizability: A general analysis	
5.4.2	Renormalizability: At the LO minimum	
6	A correct parametrization of the Goldstone manifold	
6.1	The pion propagator	
6.2	Free energy and renormalization	