

Questions

Consider our friends, the two low-lying meson nonets (octet + singlet), the baryon decuplet, and the baryon octet. For each,

1. Fill in all the particles.
2. Give their masses.
3. What is the interaction for the dominant decay of each?

Next, let's discuss masses.

So far, we have made two points:

- A. If $SU(3)$ were exact, all the masses within a multiplet would be the same.
- B. Mass splittings between rows can be understood in terms of the heavier strange quark.

The masses of the pseudoscalars involve some subtle points.

- a. The pion mass is anomalously low. This is an effect of the spontaneous breaking of chiral symmetry. In the limit of zero mass for the up and down quarks, the pions would be the massless Goldstone bosons of chiral symmetry

breaking. The η_8 would be included too if the strange quark mass were to vanish.

b. The U(1) anomaly affects the η'

c. The η_1 mixes with pure glue.

4. How do we understand the splittings between K and K^* , p and Δ , etc.?

5. What operator is involved?

6. Why is the D D^* splitting smaller than the K K^* splitting?