Constituent Quarks : U, D, S...

- explain hadron spectroscopy $p = UUD$

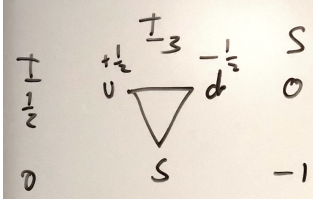
Current quarks: u, d, c, s, t, b → p = mes

– explain hadron structure

→ "quark-parton interpretation of DIS"

→ fundamental entities in QCD-Lagrangian

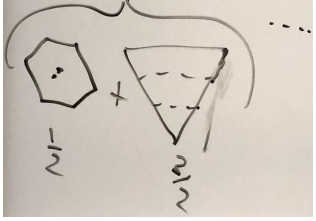
Spin – Flavor

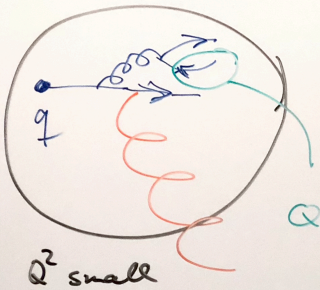


$SU(6)$

$[SU(6)]^3$

$= \underset{L=0}{56} + \underset{L=0}{70} + \ldots$





Q^2 large

Q^2 small

$q(x)$ $\bar{q}q, g$ (x suppr.)

$|p\uparrow\rangle$

$\langle \frac{1}{2}\frac{1}{2} | 1, \frac{1}{2} -\frac{1}{2}\rangle = \sqrt{\frac{2}{3}}$

$\langle \frac{1}{2}\frac{1}{2} | 1 0, \frac{1}{2} +\frac{1}{2}\rangle = \sqrt{\frac{1}{3}}$

$u\,u\,\uparrow$

$|p\uparrow\rangle = \sqrt{\frac{2}{3}}|uu\uparrow\rangle|0\downarrow\rangle + \sqrt{\frac{1}{3}}|uu\Rightarrow\rangle|0\uparrow\rangle$

$S=1, S_z=1$

$\uparrow\uparrow = |\uparrow\uparrow\rangle$

$S=1, S_z=0$

$\Rightarrow = \frac{1}{\sqrt{2}}(|\uparrow\downarrow\rangle + |\downarrow\uparrow\rangle)$

$S_z=-1$

$\downarrow\downarrow = |\downarrow\downarrow\rangle$

