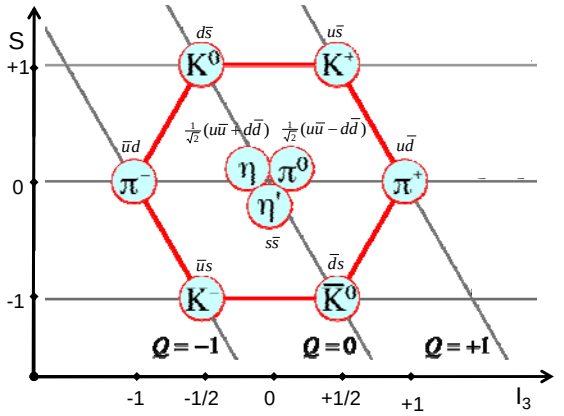
Outline

- Relativistic Kinematics
  - (4-momentum)2 invariance, invariant mass
  - Hypothesis testing, production thresholds
  - Cross-sections, flux and luminosity, accelerators
  - Particle lifetime, decay length, width
- Classification of particles
  - Fermions and bosons
  - Leptons, hadrons, quarks
  - Mesons, baryons
- Quark Model
  - Meson and baryon multiplets
  - Isospin, strangeness, c, b, t quarks
- Particle Interactions
  - Colour charge, QCD, gluons
  - Virtual particles and range of forces
  - Strong and weak decays, conservation rules
  - Parity, charge conjugation, CP
  - Weak decays of quarks
  - Charmonium and upsilon systems
- Electroweak Interactions
  - Charged and neutral currents
  - W, Z, LEP experiments
  - Higgs and the future
- LHC Experiments
- Future – introduction to accelerator physics

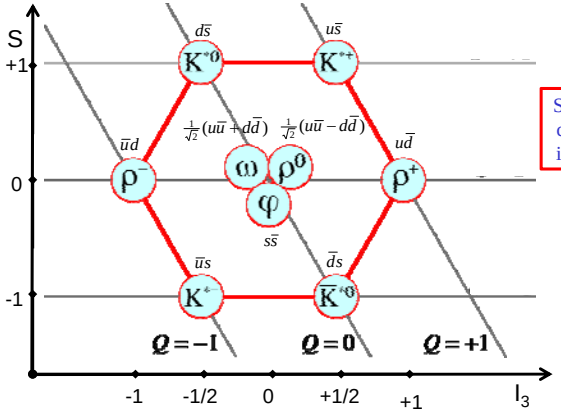
Please see web page for specific references to textbooks and brief reviews from PDG.

$^1S_0$ Meson Nonet



[adapted from http://en.wikipedia.org/wiki/File:Meson_nonet_-_spin_0.svg]

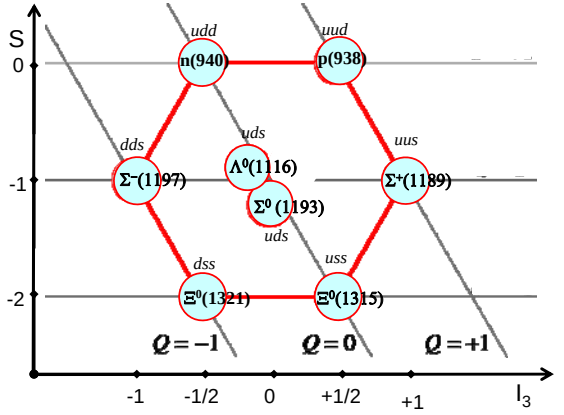
$^3S_1$ Meson Nonet



Same quark contents as in $^1S_0$ octet

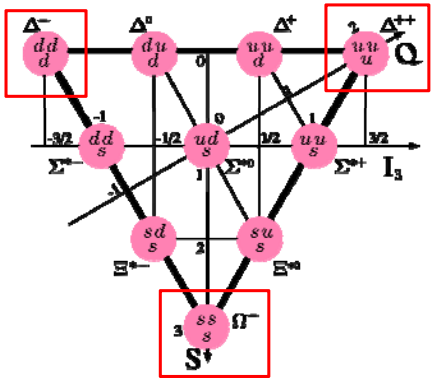
[adapted from http://en.wikipedia.org/wiki/File:Meson_nonet_-_spin_1.svg]

J=1/2 Baryon Octet



[adapted from http://en.wikipedia.org/wiki/File:Meson_nonet_-_spin_1.svg]

J=3/2 Baryon Decuplet



Same valence quark as in J=1/2 octet, with new members

[from http://en.wikipedia.org/wiki/File:Baryon-decuplet-small.svg]