



Basics to play

Elementary Particle Cards

Quarks	Antiquarks	Charged leptons	Charged antileptons
blue u	anti-blue anti-u	electron	muon
green d	anti-green anti-d	positron	antimuon
red s	anti-red anti-s	Neutrinos electron-neutrino muon-neutrino electron-antineutrino muon-antineutrino	

You do NOT need to memorize these!
at least at the beginning...

baryon	antibaryon	leptons	anti-leptons
meson meson meson		electron family muon family	

lepton - antilepton pairs

To memorize it simply: "antiparticles have one more line compared to particles."

ν_μ vs $\bar{\nu}_\mu$
 μ^- vs μ^+

Examples

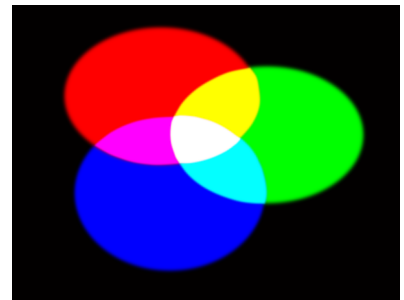
baryons

mesons

antibaryons

Hadrons have to be color neutral: they have all three colors. A baryon (antibaryon) has three quarks (antiquarks) and a meson consists of a quark and an antiquark.

additive color mixing of light



Physicists could not find an isolated free quark in Nature. Quarks are bound together by the strong interaction and they can be found only in hadrons or under extreme conditions in the quark-gluon plasma.

The color of quarks reflects on the fact that detectable particles made of quarks and/or antiquarks must be color neutral (white), analogously to the additive color mixing of red, blue and green lights in optics. The color of a quark is not a visible property though. Moreover, these elementary particles are so tiny, that they could not be observed with the naked eye, neither by an optical microscope, nor by an electron microscope.