I'm trying to count the total number of hadrons; any help is welcomed, is all this right?

Baryons: I counted the number of possible baryons for each quark configuration considering that the 3 spins may be aligned making a spin 3/2 baryon or the spin of one quark may be opposed to the other 2 making a spin 1/2 baryon.

uuu 2 hadrons (all spins aligned + one u opposed to the other 2)
uud 3 (asa + one u opposed + the d opposed)
udd 3 (asa + u + d)
ddd 2 (asa + d)
uus 3,(asa + u + s)
uds 4, dds 3, uss 3, dss 3, sss 2, uuc 3, udc 4, ddc 3,
usc 4, dsc 4, ssc 3, ucc 3, dcc 3, scc 3, ccc 2, uub 3,
udb 4, ddb 3, usb 4, dsb 4, ssb 3, ucb 4, dcb 4, scb 4,
ccb 3, ubb 3, dbb 3, sbb 3, cbb 3, bbb 2, uut 3, udt 4,
ddt 3, ust 4, dst 4, sst 3, uct 4, dct 4, sct 4, cct 3,
ubt 4, dbt 4, sbt 4, cbt 4, bbt 3, utt 3, dtt 3, stt 3,
ctt 3, btt 3, ttt 2

63 quark configurations with a total of 182 baryons

Mesons: for each one of the quark configurations there are 2 possible mesons, one with spin 0 (spins opposed) and one with spin 1 (spins aligned)

(uppercase means antiquark)

uU, uD, dU, dD, uS, dS, sU, sD, sS, uC, dC, sC,
cU, cD, cS, cC, uB, dB, sB, cB, bU, bD, bS, bC,
bB, uT, dT, sT, cT, bT, tU, tD, tS, tC, tB, tT

36 quark configurations with a total of 72 mesons

So it's 182 baryons plus 182 antibaryons plus 72 mesons = 436 hadrons
Is that right?

Also I calculated that the number of hadrons if n quarks exist is:
4/3*n^3+4*n^2+2/3*n
A table of that:
1 - 6
2 - 28
3 - 74
4 - 152
5 - 270
6 - 436
7 - 658
8 - 944
9 - 1302

Tell me if I did anything wrong.

Roman Arce (qmfun at yahoo dot com)
Roman Arce" <shampoo@fibertel.com.ar píše o baryonech
shampoo@fibertel.com.ar (Roman Arce) writes: baryony

Roman Arce wrote:

> I'm trying to count the total number of hadrons; any help is welcomed,
> is all this right?

I can't completely answer your question, but here's my attempt. In terms of simple combinatorics, I think you have the correct answer, but in terms of particles that actually are seen in colliders, you count far too many.

> <snip>
>
> ccb 3, ubb 3, dbb 3, sbb 3, cbb 3, bbb 2, uut 3, udt 4,
> ddt 3, ust 4, dst 4, sst 3, uct 4, dct 4, sct 4, cct 3,
> ubt 4, dbt 4, sbt 4, cbt 4, bbt 3, utt 3, dtt 3, stt 3,
> ctt 3, btt 3, ttt 2

Careful! We don't see a lot of these. The top is very much more massive than the other quarks (about 175 GeV) and decays much more quickly, before hadronisation occurs. It could be that these are stable at certain energies (help from an expert would be nice), but in terms of typical, "real-world" scenarios or collider experiments, we don't get hadrons including the top. The bottom, on the other hand, does occur in B mesons and a few baryons (e.g. in udb, usb, and dsb configurations). Check the PDG particle data book (pdg.lbl.gov) for listings of all the known hadrons and their properties. You can't rely just on combinatorics, because the quarks have radically different masses and this does influence the formation of the hadrons. I don't know enough to give you much more detailed information.

Matt Reece mreece@midway.uchicago.edu
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In loop quantum gravity the analogue of a Feynman diagram is called a
>"spin foam", because it looks a bit like a foam of soap bubbles. A spin
>foam has 2-dimensional faces in addition to the 1-dimensional edges and
>0-dimensional vertices of a Feynman diagram.

Is it possible to define a vertex in each cell of a spin foam, and define an edge passing through each face connecting the vertices in the cells on either side, and thereby reduce the foam to a network, as it would be for a 3-d foam?

: baez@math.ucr.edu gravitace

http://continue.to/emam moje moje moje
http://www.geobutton.com/geophrase.htm

kastor@physics.umass.edu David Kastor strunová teorie

Name	Spin	Superpartner	Spin
Graviton	2	Gravitino	3/2
Photon	1	Photino	1/2
Gluon	1	Gluino	1/2
$W^{+,-}$	1	Wino$^{+,-}$	1/2
Z^0	1	Zino	1/2
Higgs	0	Higgsino	1/2

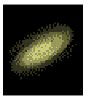
Known particles that make up matter, and their possible superpartners

Name	Spin	Superpartner	Spin
Electron	1/2	Selectron	0
Muon	1/2	Smuon	0
Tau	1/2	Stau	0
Neutrino	1/2	Sneutrino	0
Quark	1/2	Squark	0

In current particle experiments we can't yet see any *direct* evidence for the existence of superpartners for known elementary particles (there is some indirect evidence, however). There is a good chance we could start to see superpartners in future particle experiments. If that happened, it could turn out to be evidence for string theory. This could take place in the next five or ten years, so come back to this web site for further news.

cosmology

How old is the Universe?



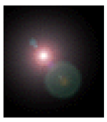
Isaac Newton made a Bible-based estimate of a few thousand years. Einstein believed in a steady state, ageless Universe. Since then, data collected from the Universe puts the probable answer somewhere in the middle.
basic / *advanced*

What is the structure of the Universe?

The Einstein equation predicts several possible ways for the Universe to evolve in time and space. What are these models and how do they compare with observation? *basic* / *advanced*

Take a trip through the Big Bang

Take a tour through the chain of physical events that cosmologists believe occurred while the expanding Universe we observe today was very small and very young.
Take the trip



What came before the Big Bang?

There's a lot of compelling evidence for the Big Bang, but what preceded it? The most accepted model is called Inflation, but it's not the kind of inflation that Alan Greenspan need fear.
basic / *advanced*

Where does string theory fit in?

What happens when the early universe is gummed up with string? And are any of these scenarios testable in the near future?
basic / *advanced*

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