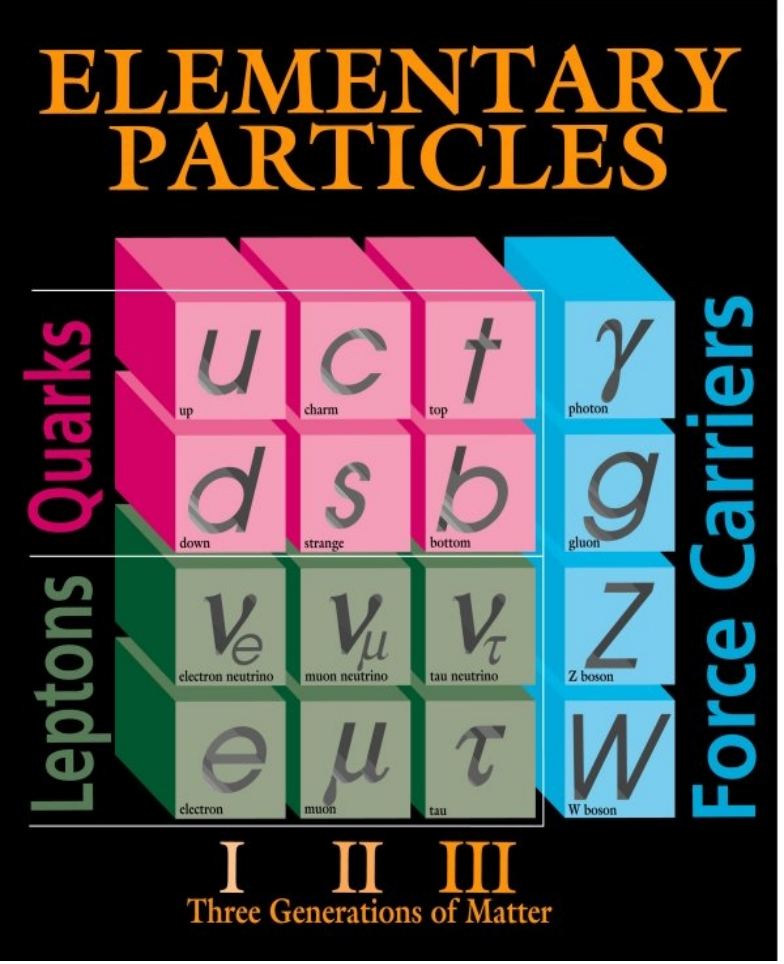
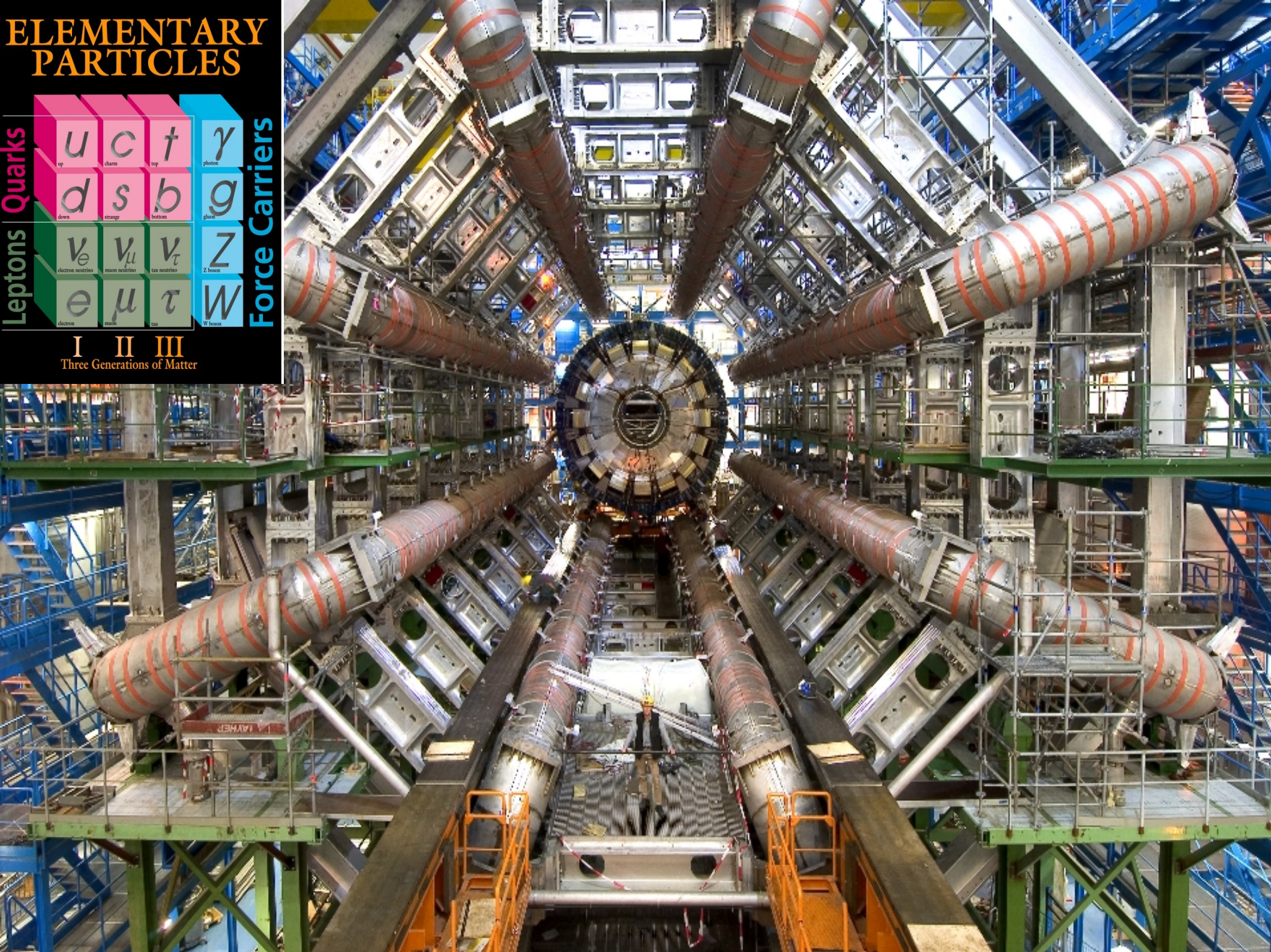
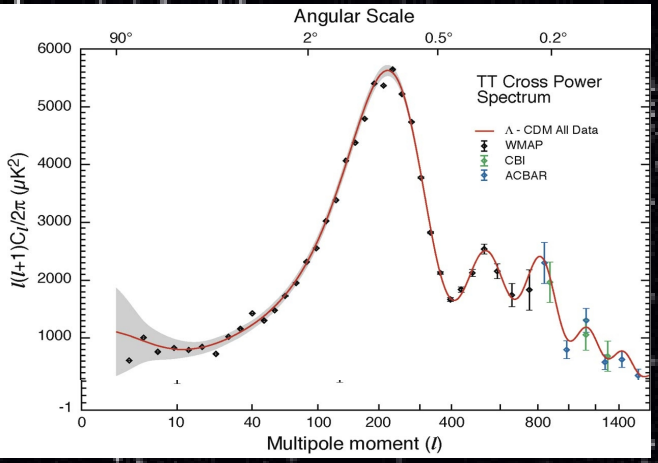


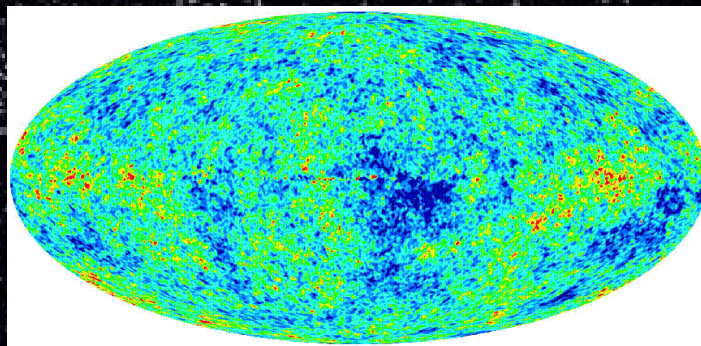
Fundamentalist physics

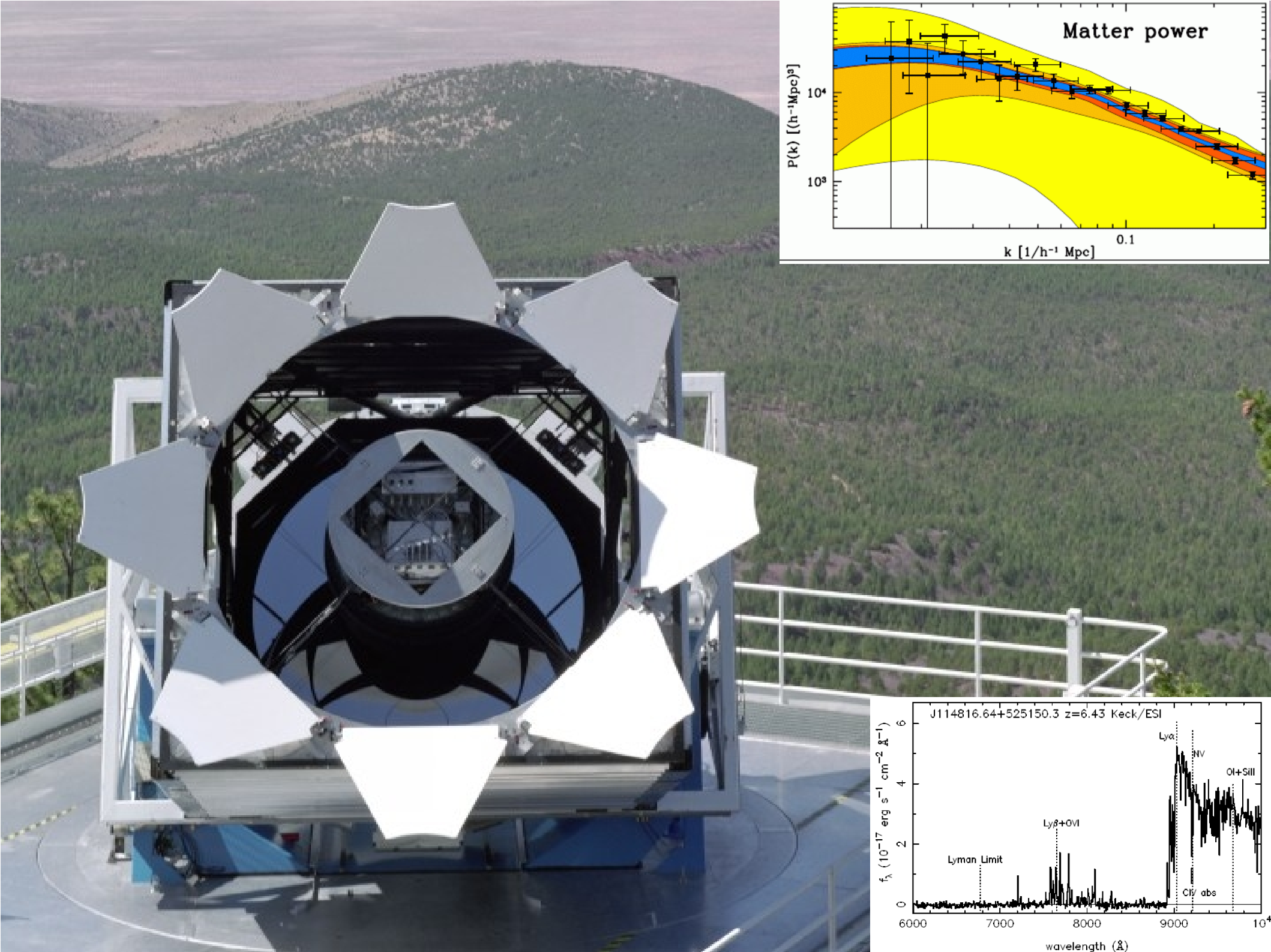
or..

Butterfly collecting


ELEMENTARY PARTICLES
Quarks
Leptons
Force Carriers
u
c
t
γ
up
charm
top
photon
d
s
b
g
down
strange
bottom
gluon
ν_e
ν_μ
ν_τ
Z
electron neutrino
muon neutrino
tau neutrino
Z boson
e
μ
τ
W
electron
muon
tau
W boson
I II III
Three Generations of Matter

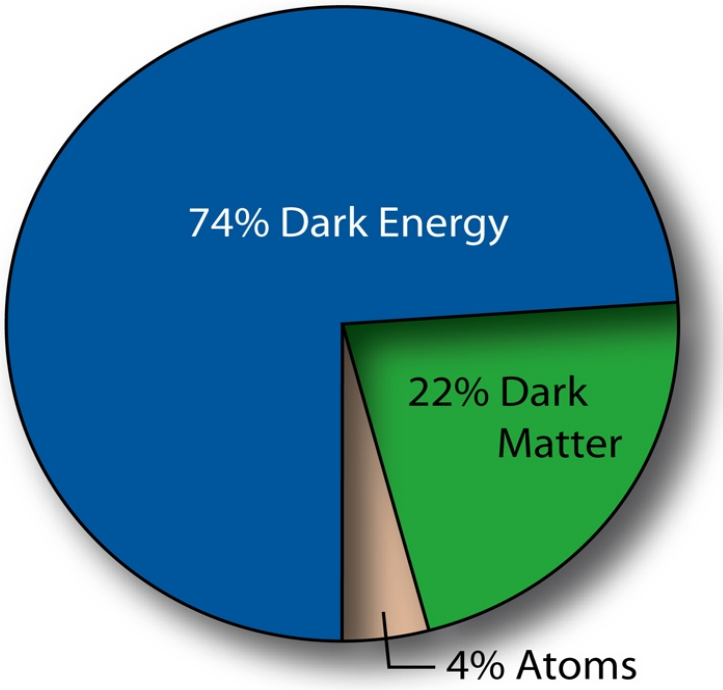

Angular Scale
90°
2°
0.5°
0.2°
TT Cross Power Spectrum
Λ - CDM All Data
WMAP
CBI
ACBAR
l(l+1)C_l/2π (μK^2)
Multipole moment (l)
6000
5000
4000
3000
2000
1000
-1
0
10
40
100
200
400
800
1400




Matter power
P(k) [(h⁻¹Mpc)³]
10⁴
10³
0.1
k [1/h⁻¹ Mpc]
J114816.64+525150.3 z=6.43 Keck/ESI
Lyα
NV
OI+SiII
Lyβ+OVI
Lyman Limit
CIV abs
f_λ (10⁻¹⁷ erg s⁻¹ cm⁻² Å⁻¹)
0
2
4
6
6000
7000
8000
9000
10⁴
wavelength (Å)

Observatories	**vs**	**Experiments**
(HST or SDSS)		(ATLAS or WMAP)
Designed for general tasks		Optimised for a single task
Serves a diverse community		Serves a coherent community
Program built through proposals		Program set at design
Many teams of all sizes		A single team
Many results unanticipated		Main results “planned”
Synthetic/astrophysics skills		Analytic/data-process. skills
Public support as a facility		Public impact through results

Dark Matter and Dark Energy



Both are unknown

DM affects all aspects of cosmic structure formation and may be detectable directly, indirectly, or at accelerators

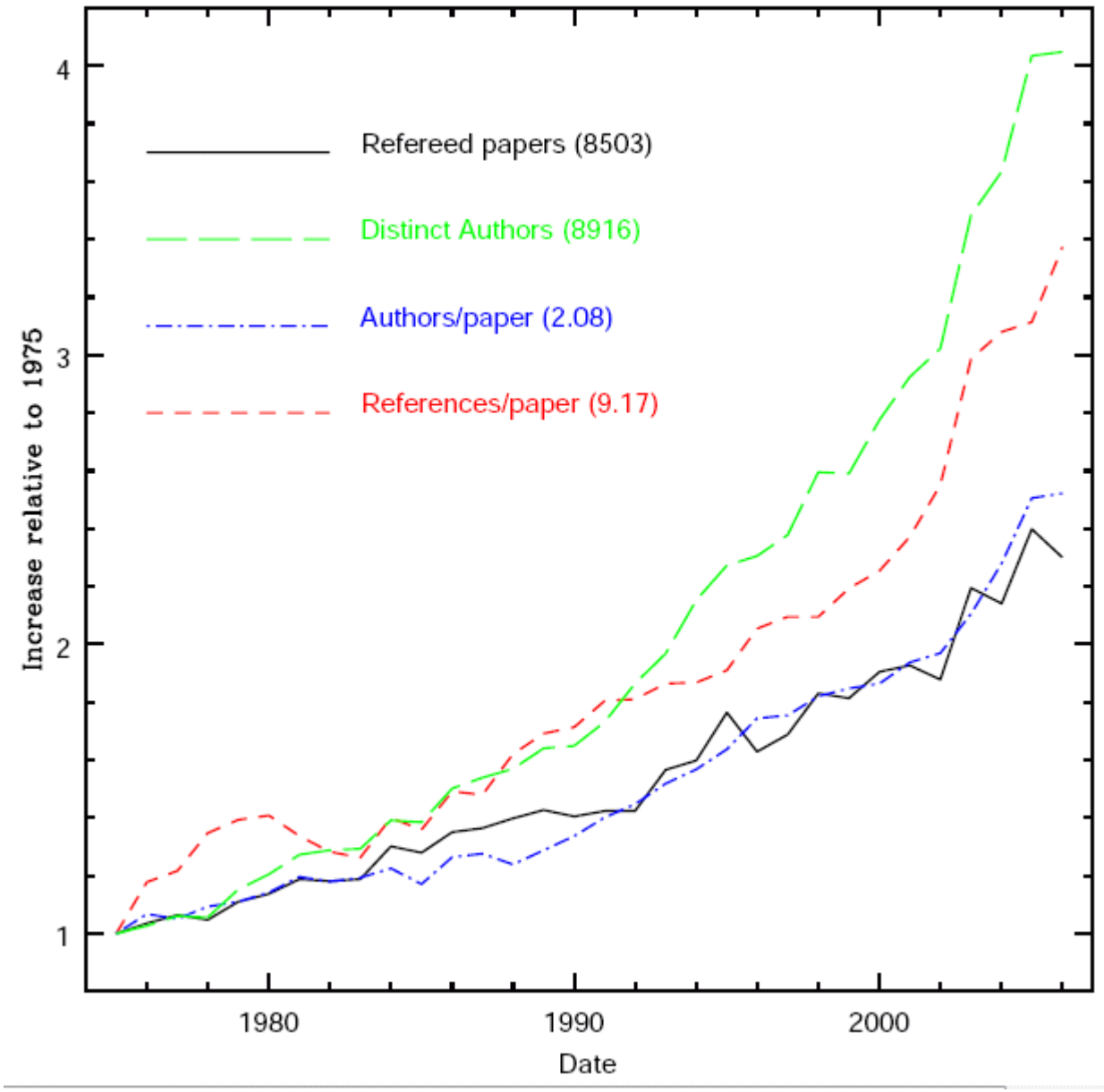
DE (apparently) affects only a(t) and g(t), both of which are already known to fairly high precision → can be investigated only by "precision" astronomy

Dangers of Dark Energy

- Inappropriate risk assessment
  --- likelihood of an “uninteresting” result
  --- likelihood of limitation by unanticipated systematics

- Overly narrow investment strategy
  --- optimisation for the primary “experimental” goal
  → elimination of ability to address other issues

- Undermining astronomy's cultural foundation
  --- Division of labour/ role and power of “teams”
  --- Allocation of scientific credit
  --- Attraction for creative young scientists
  --- Attraction for the general public


Refereed papers (8503)
Distinct Authors (8916)
Authors/paper (2.08)
References/paper (9.17)
Increase relative to 1975
Date
1
2
3
4
1980
1990
2000

August 2003

The MOST-CITED Researchers In: Space Science

Previous | 2006 Field Menu | 2005 Field Menu | 2004 Field Menu | 2003 Field Menu

Ranked by total citations. (10 of 621)

RANK	SCIENTIST	PAPERS	CITATIONS	CITATIONS PER PAPER
1	FILIPPENKO, AV	212	8,484	40.02
2	FABIAN, AC	268	6,953	25.94
3	FRENK, CS	104	6,866	66.02
4	WHITE, SDM	100	6,850	68.5
5	ELLIS, RS	113	6,138	54.32
6	KOUVELIOTOU, C	190	5,228	27.52
7	HUCHRA, JP	124	5,207	41.99
8	SCHNEIDER, DP	173	5,088	29.41
9	VANPARADIJS, J	193	4,902	25.4
10	KULKARNI, SR	161	4,560	28.32

"Essential Facts" contains very useful information to help you understand how the *ISI Essential Science Indicators*[SM] Web product works such as citation thresholds, etc.

SOURCE: *ISI Essential Science Indicators* Web based product from the November 1, 2003 update covering a ten year plus eight month period, January 1993 - August 31, 2003. This is the fourth bimonthly period.

August 2007

Ranked by total citations. (10 of 731)
(with ≥5 papers published)

RANK	SCIENTIST	PAPERS	CITATIONS	CITATIONS PER PAPER
1	FILIPPENKO, AV	231	15,219	65.88
2	SCHNEIDER, DP	303	14,790	48.81
3	BRINKMANN, J	271	14,250	52.58
4	YORK, DG	206	12,803	62.15
5	IVEZIC, Z	152	12,030	79.14
6	ELLIS, RS	143	11,859	82.93
7	GUNN, JE	128	11,502	89.86
8	FRENK, CS	132	11,410	86.44
9	STRAUSS, MA	154	11,392	73.97
10	FUKUGITA, M	128	11,177	87.32

What should be done?

- Recognise (and exploit) astro./H.E. cultural differences
- Design instruments to address a wide spectrum of issues
- Prioritise based on broad impact as well as primary goal
- Promote creative “secondary” science within large projects
- Assign scientific credit based on intellectual contribution
- Ensure “astro” projects enhance creativity in astrophysics