

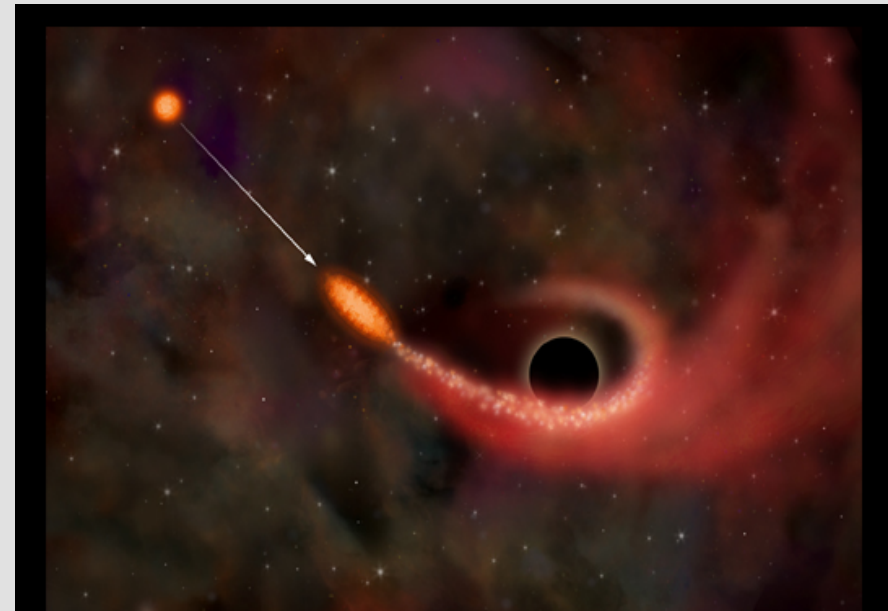
The Large Synoptic Survey Telescope



- The Universe in 4D
- A movie of the sky

Questions I'd like answered

- Where are all the killer rocks ?
- how did the Milky Way form ?
- are there giant black holes in galaxies ?
- what is dark matter ?
- what is dark energy ?



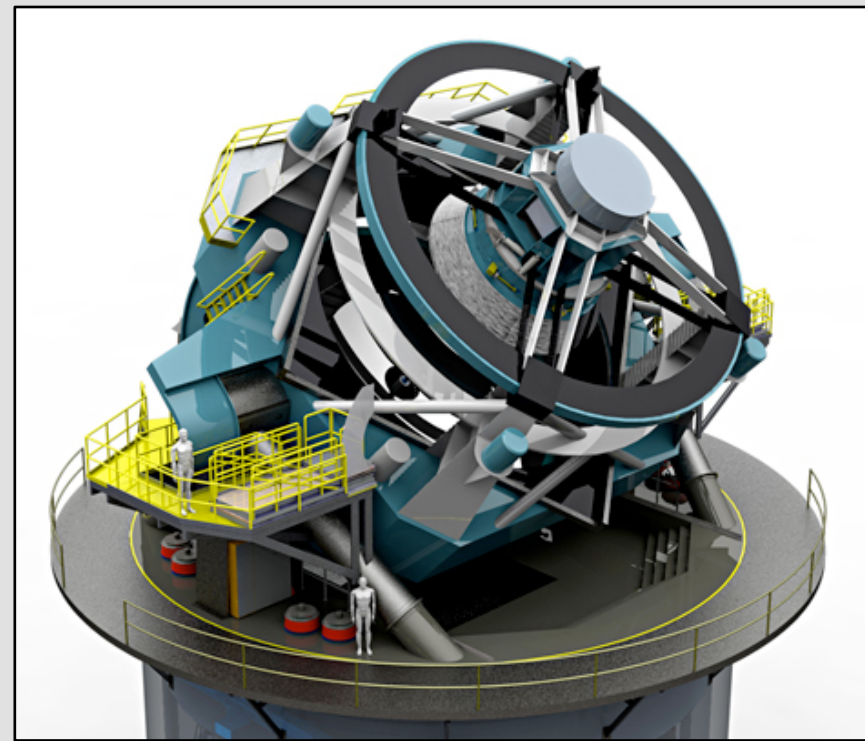
A new kind of telescope

- Want pictures that are :

Wide angle
AND deep
AND sharp

- Then we can
image big patches of sky in a few seconds
map the **whole sky every week**
... again and again

- ➔ build up a super deep map of the whole sky
- ➔ make a movie of how the sky changes
- ➔ spot things that go bang in the night

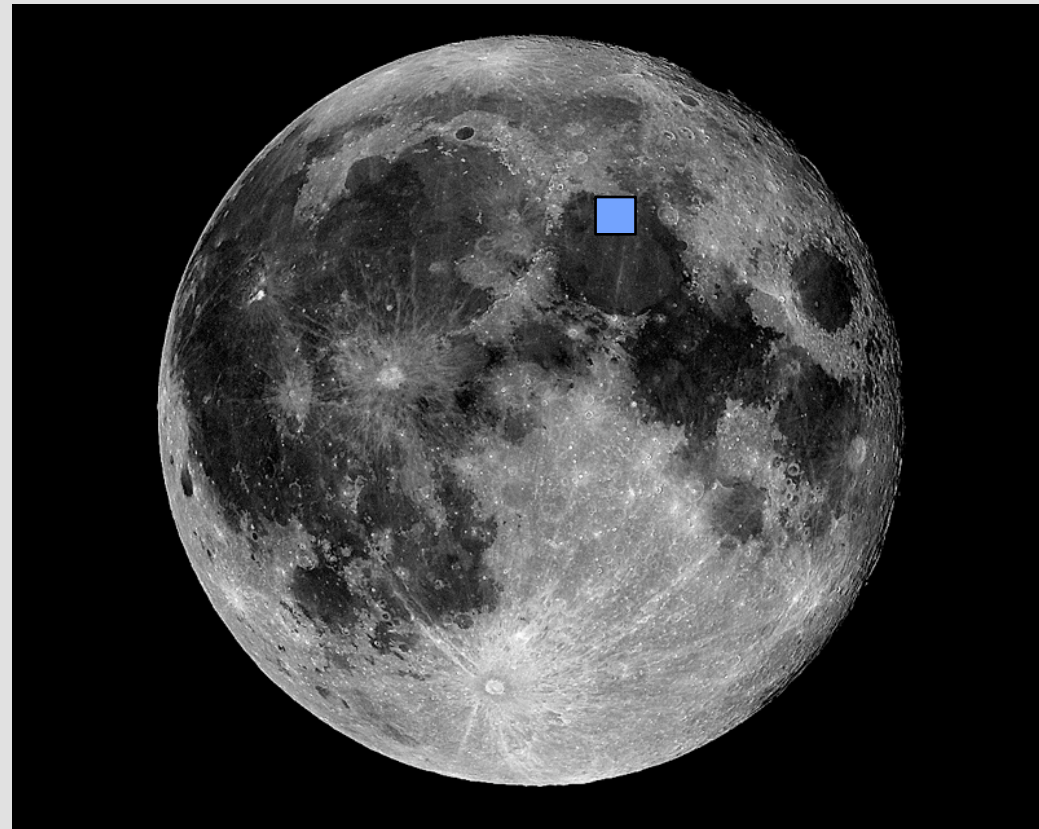


Wide angle



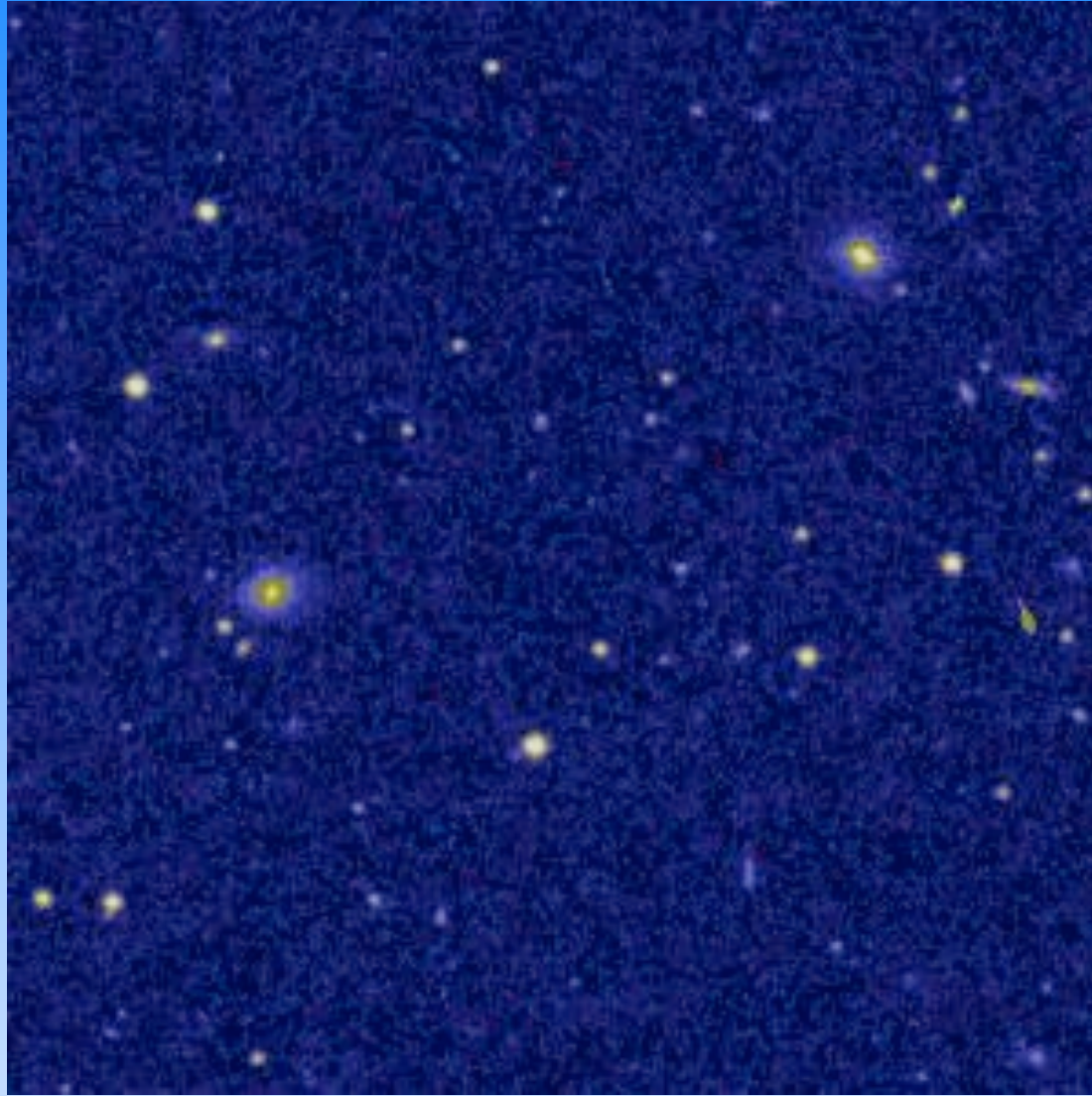
Camera field of view mock-up compared to Moon

Hubble Space Telescope camera field of view compared to Moon



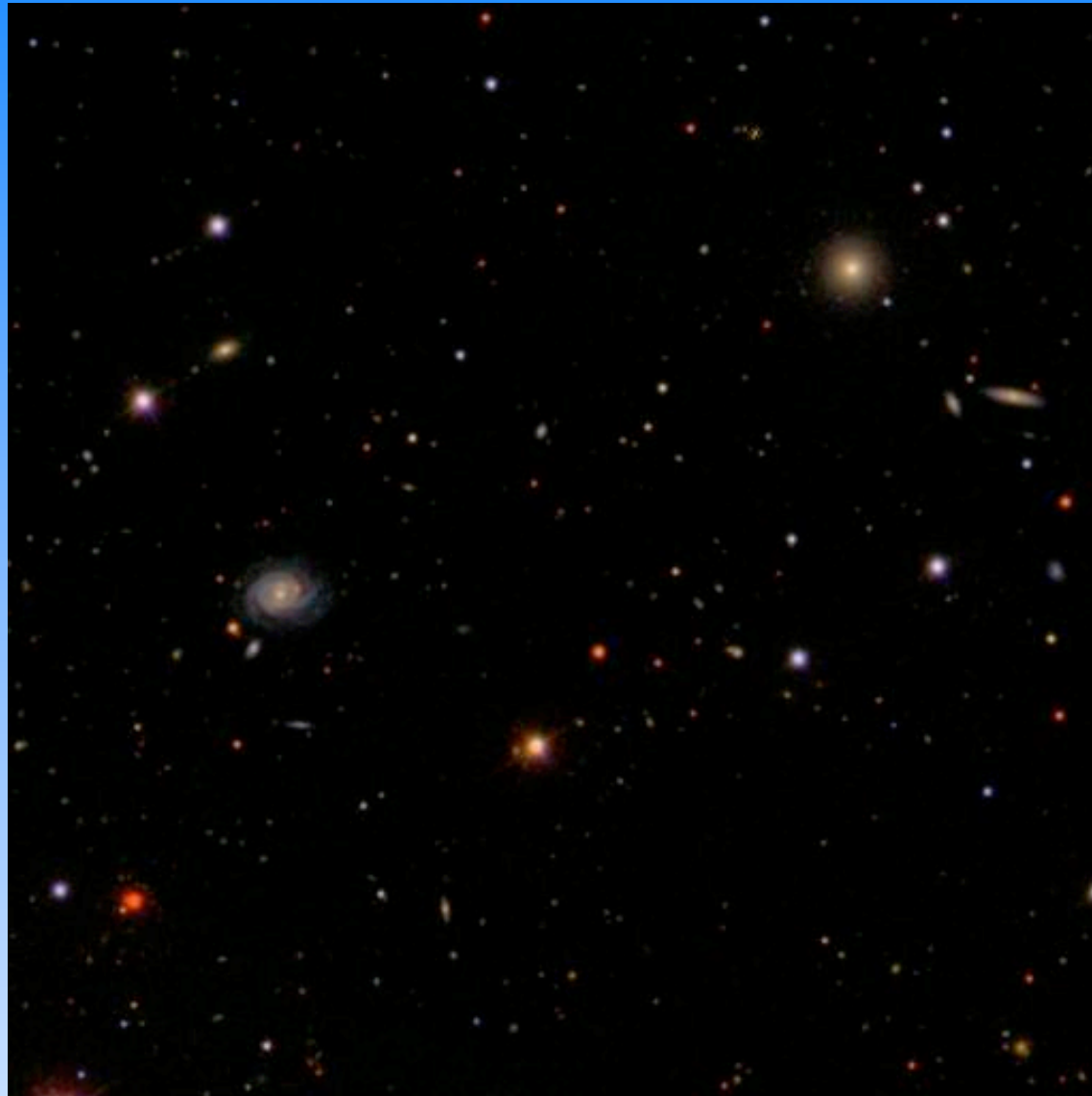
1970 : photographic sky surveys

One quarter the diameter of the moon



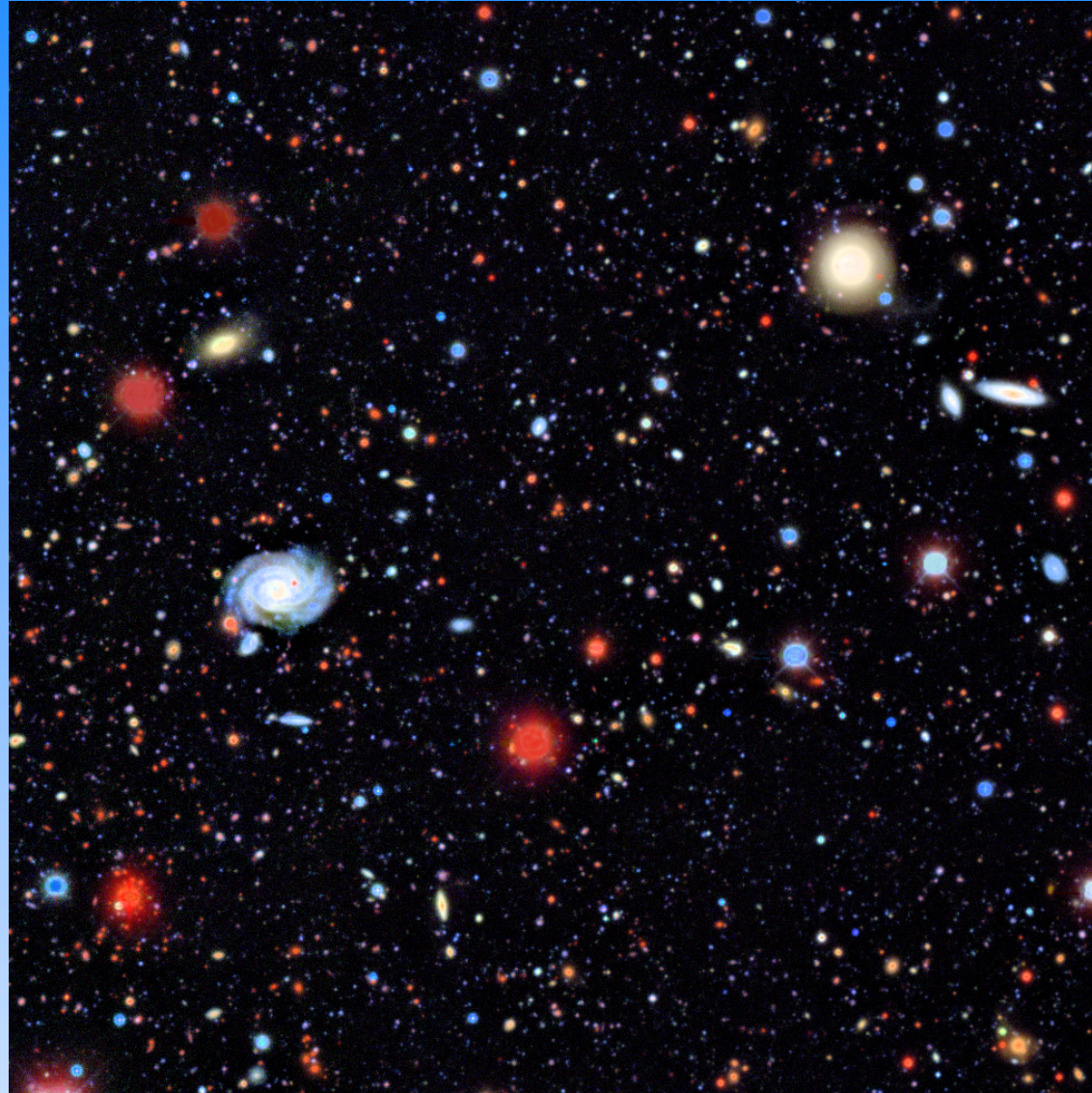
Full sky available

2000 : Sloan Digital Sky Survey



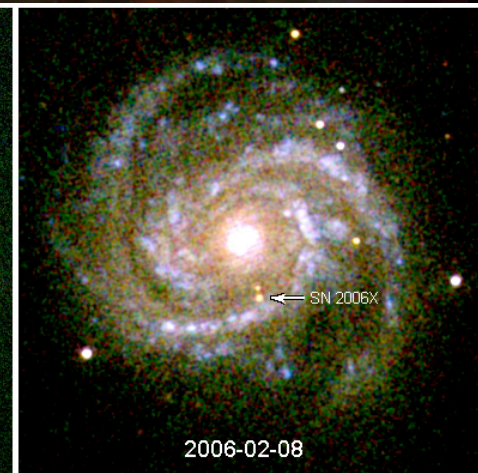
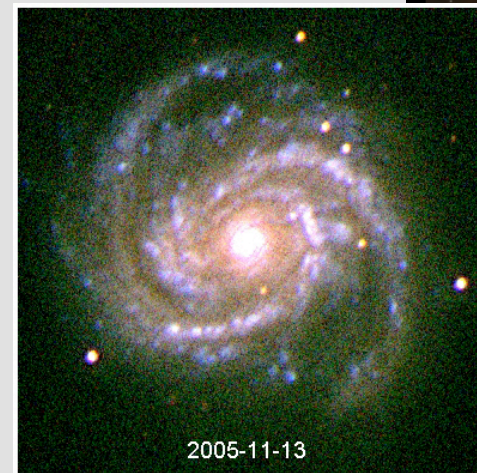
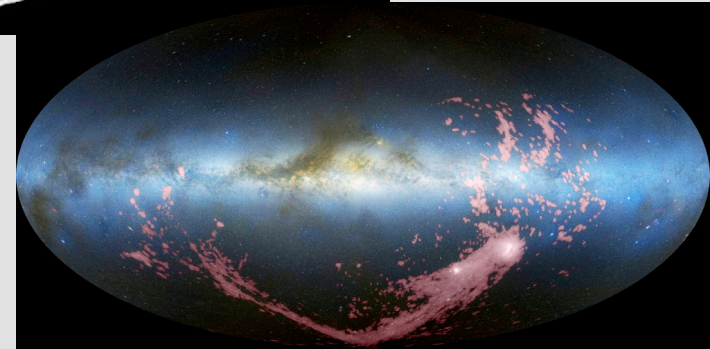
10% of sky done

2020 : LSST



Answering those questions

- killer rocks ?
they're the ones that move fast
- Milky Way history ?
find the moving streams of stars left over from colliding with other galaxies
- giant black holes ?
one in a million per year will flare up a when star is swallowed
- dark matter ?
map the slight distortions of millions of galaxies revealing the gravity of invisible matter
- dark energy ?
catch distant supernovae, seen in the past measure how the expansion of the universe has changed



Scary data

- 30,000 GB every night
- All public straight away
 - for schools as well as scientists
- Processed in 60 seconds
 - will send out global alerts on transients
- A serious computing challenge !
 - Economically relevant
 - Google and Microsoft are interested



Enough for ten nights of LSST storage at Edinburgh supercomputer centre

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- ... 6p / year each