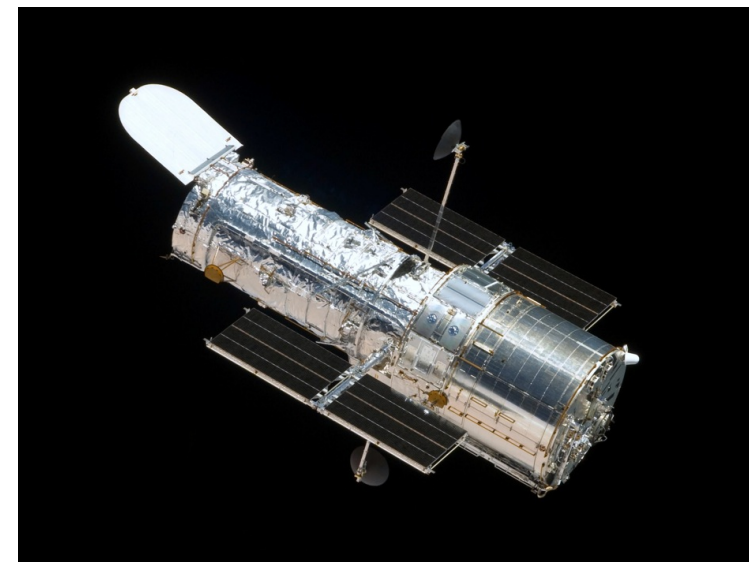
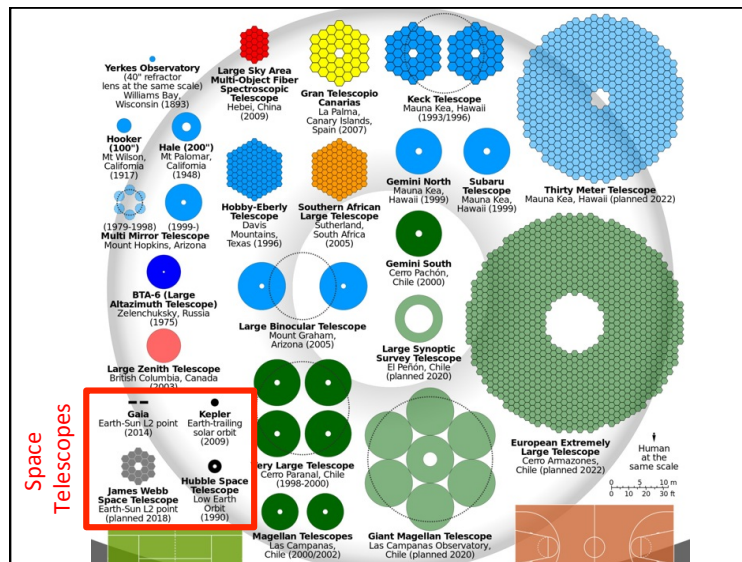
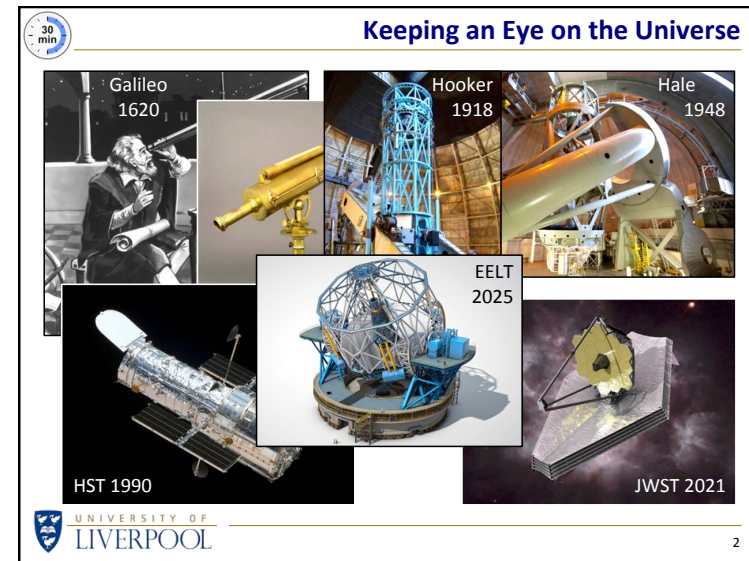
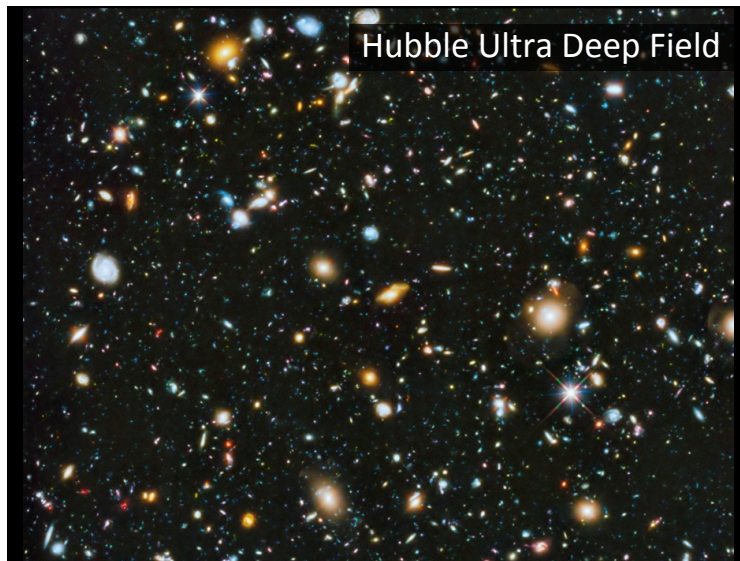


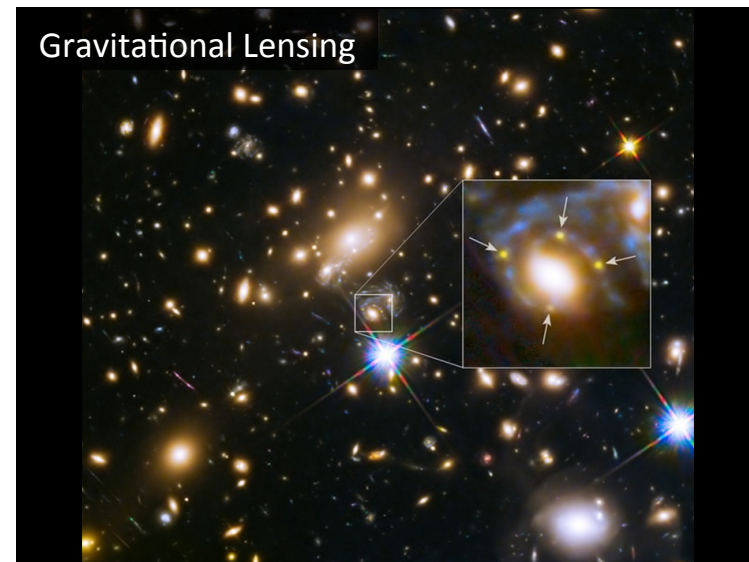
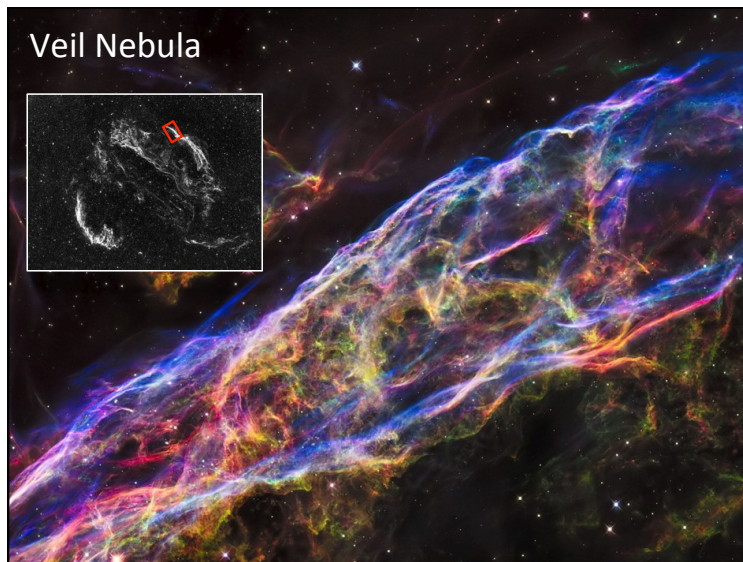
The Universe: Half an Hour at a Time – Keeping an Eye on the Universe



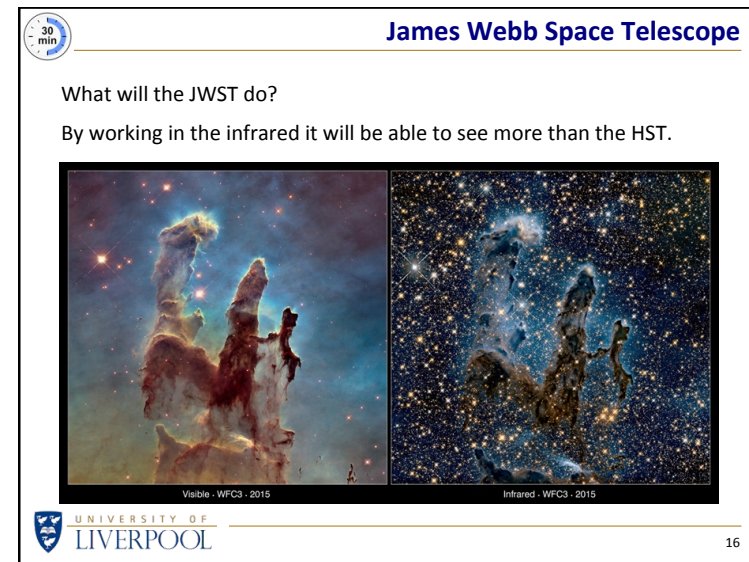
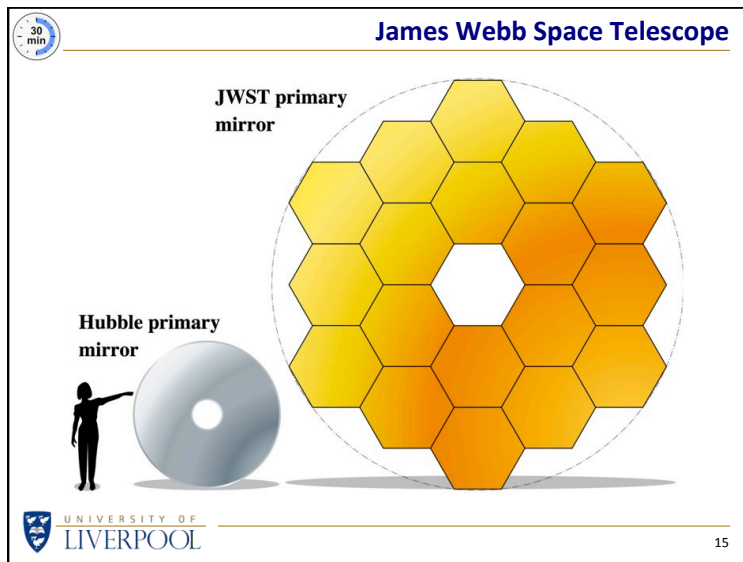
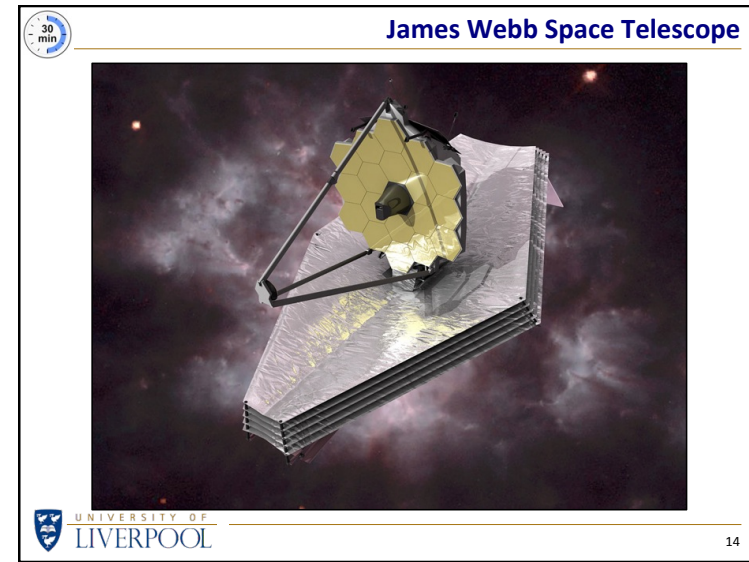
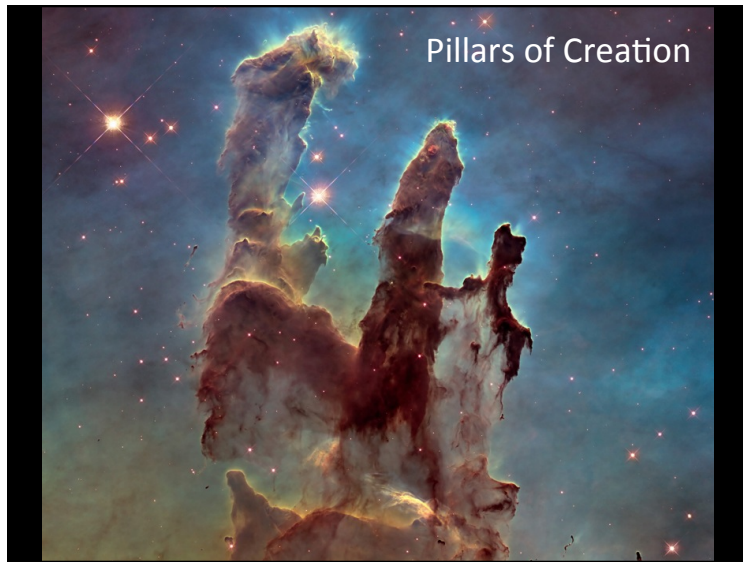
The Universe: Half an Hour at a Time – Keeping an Eye on the Universe



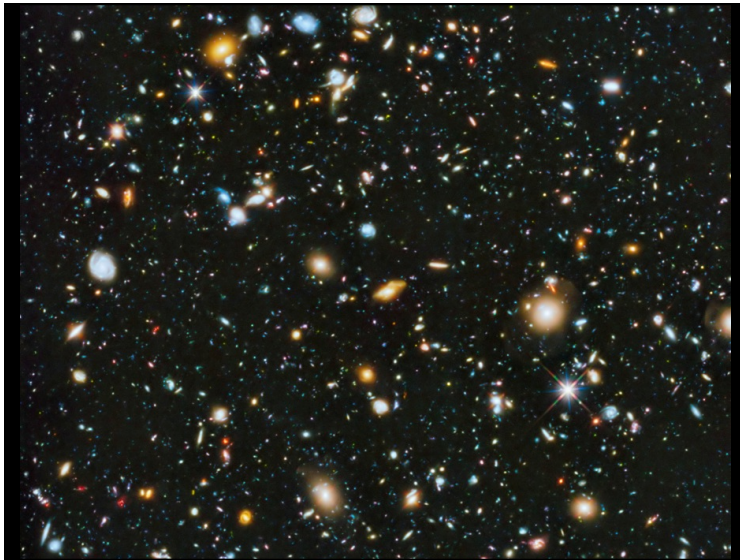
The Universe: Half an Hour at a Time – Keeping an Eye on the Universe




The Universe: Half an Hour at a Time – Keeping an Eye on the Universe

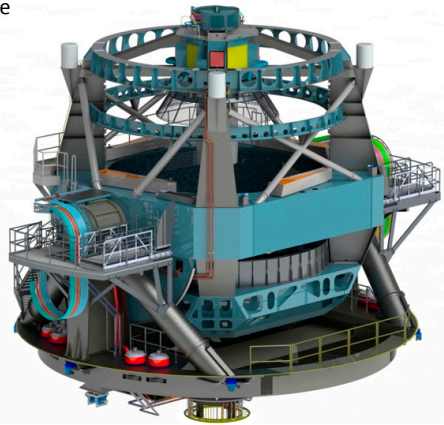



The Universe: Half an Hour at a Time – Keeping an Eye on the Universe



 **Large Synoptic Survey Telescope**

Renamed the
Simonyi
Survey
Telescope



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 **LSST Primary Mirror**




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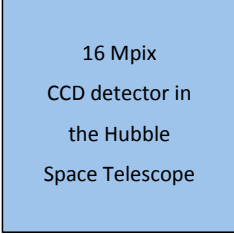
19

 **Camera CCD**

Camera module from a mobile phone




... and at the same scale



16 Mpix
CCD detector in
the Hubble
Space Telescope

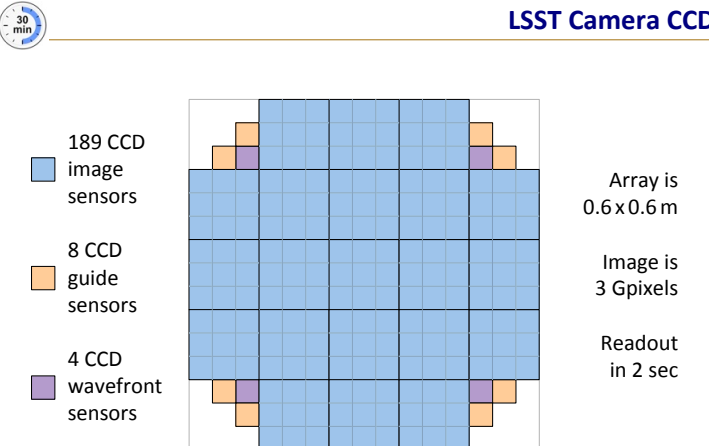
40 mm

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The Universe: Half an Hour at a Time – Keeping an Eye on the Universe

LSST Camera CCD



30 min


- 189 CCD image sensors
- 8 CCD guide sensors
- 4 CCD wavefront sensors

Array is 0.6x0.6 m
Image is 3 Gpixels
Readout in 2 sec

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LSST Camera



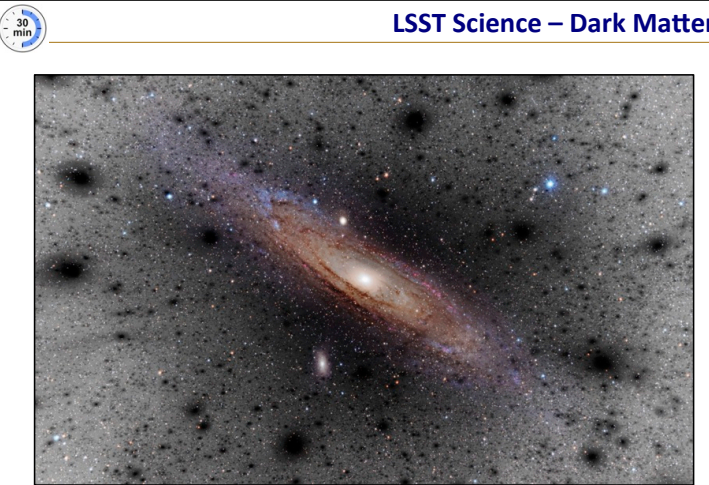
30 min

This simulated image is about a Mpixel, or 0.03% of the full-sized image captured by the camera, and gives an idea of what can be expected to be seen in a single 15 sec exposure.

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LSST Science – Dark Matter

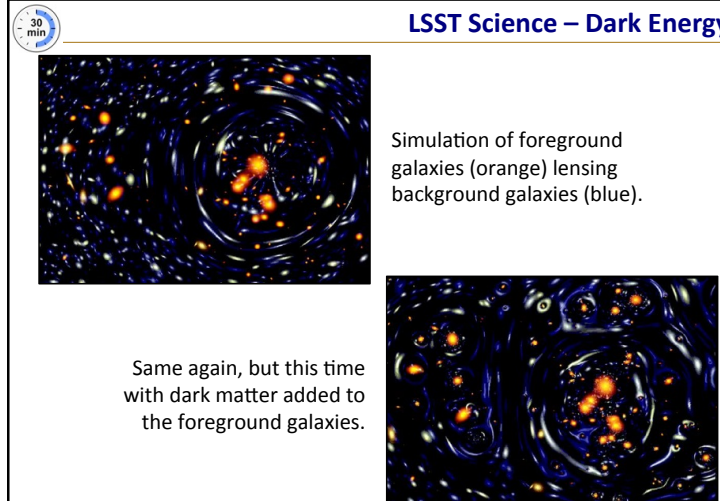


30 min

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LSST Science – Dark Energy



30 min

Simulation of foreground galaxies (orange) lensing background galaxies (blue).

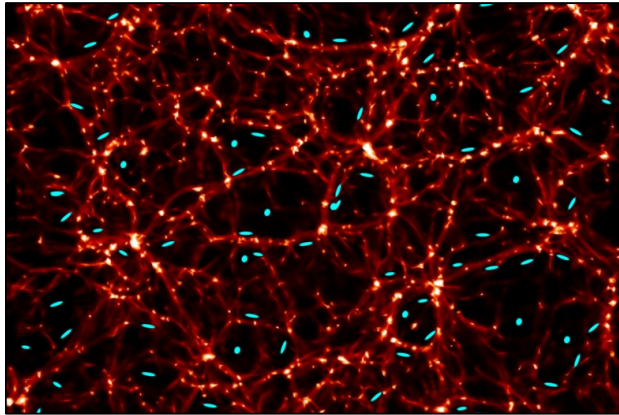
Same again, but this time with dark matter added to the foreground galaxies.

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The Universe: Half an Hour at a Time – Keeping an Eye on the Universe

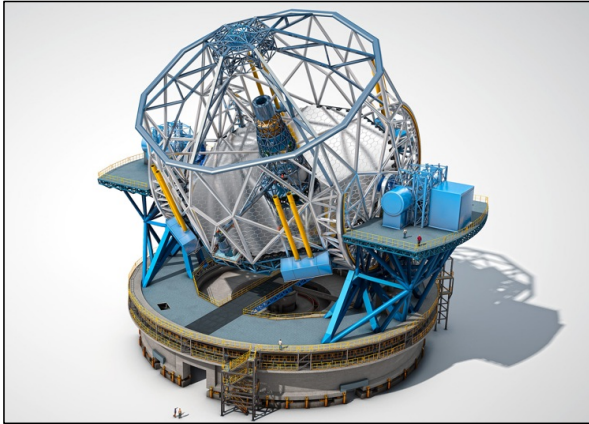
LSST Science – Dark Energy



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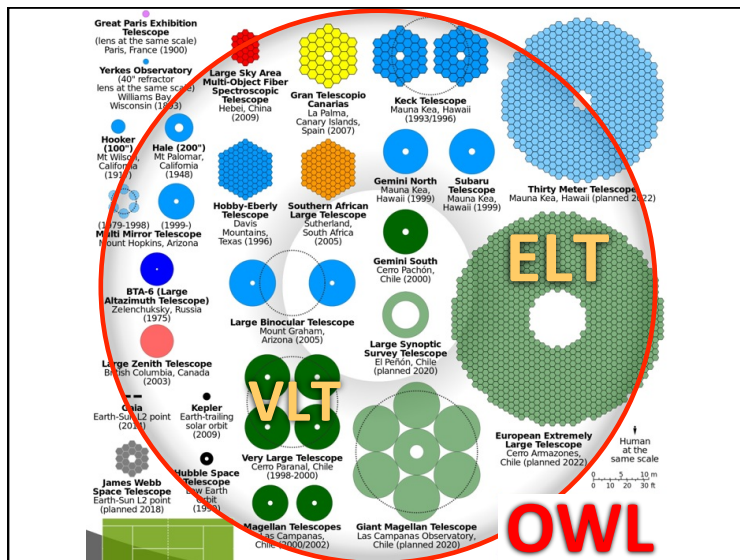
25

European Extremely Large Telescope



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26



Keeping an Eye on the Universe

30 min

www.liverpool.ac.uk/~sdb/Talks

Dr Steve Barrett

GSW 31 Aug 2021