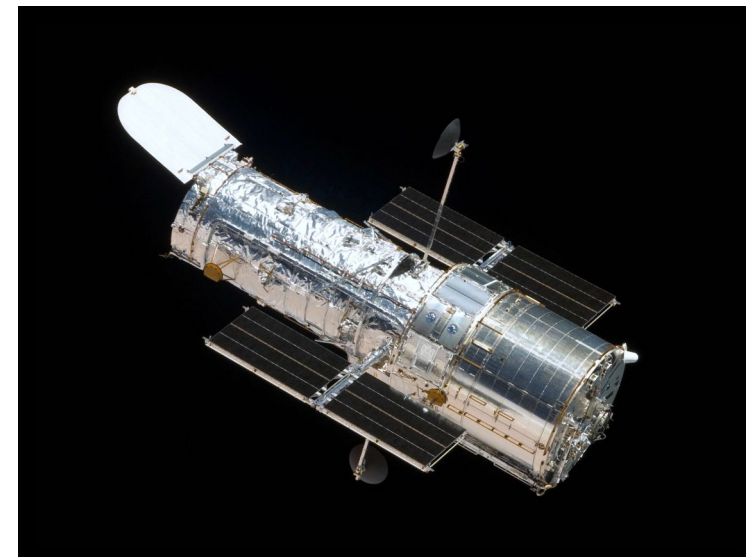
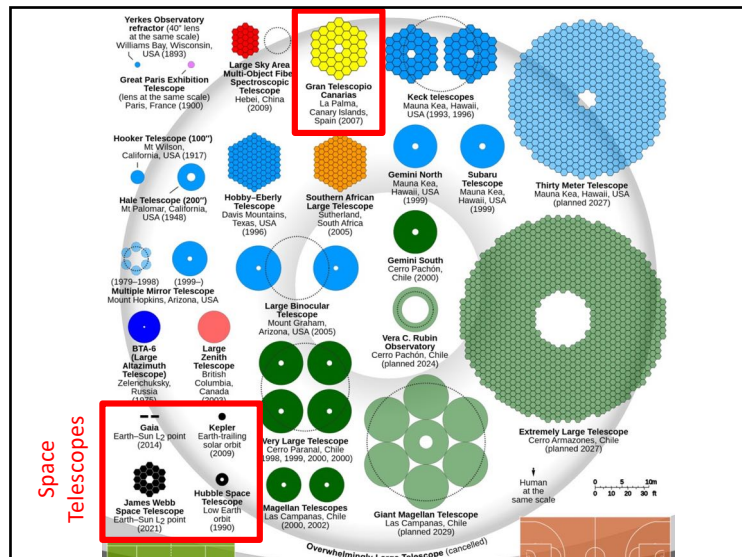
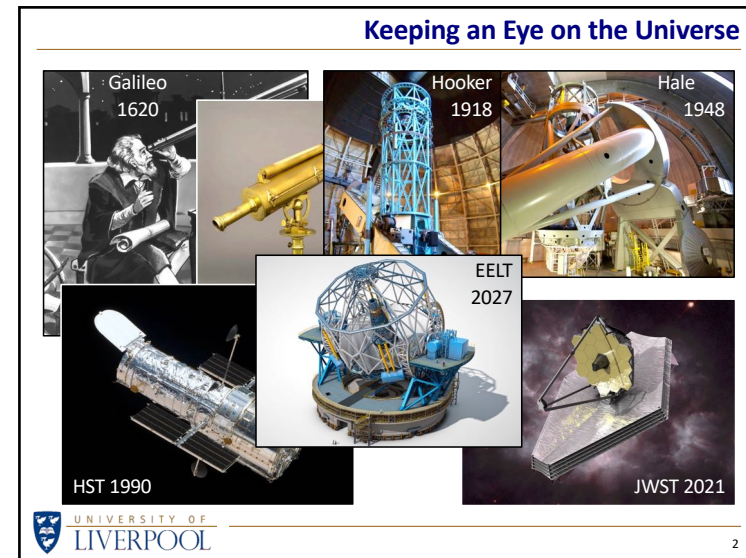
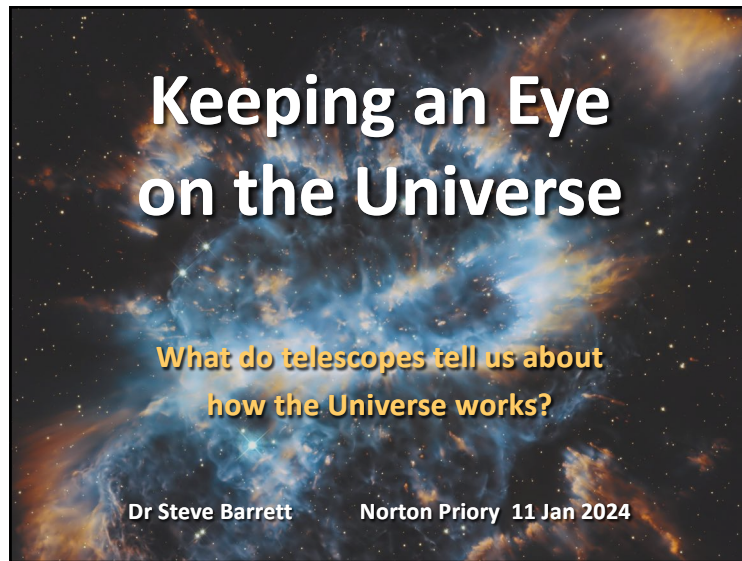
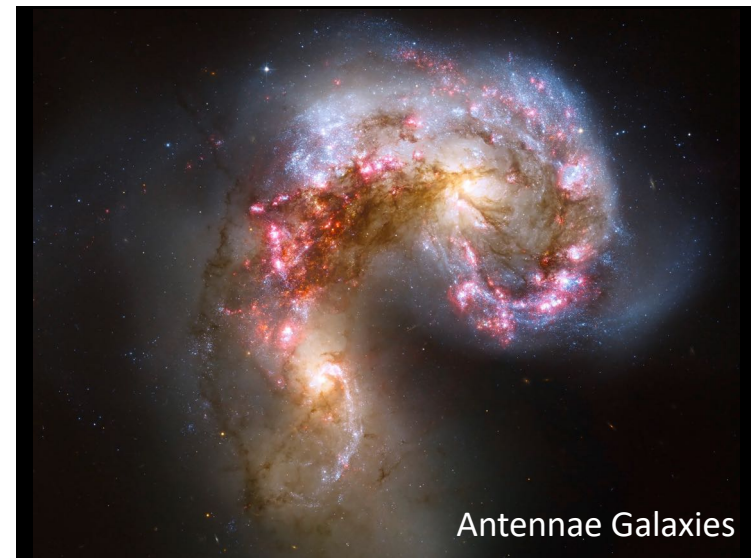
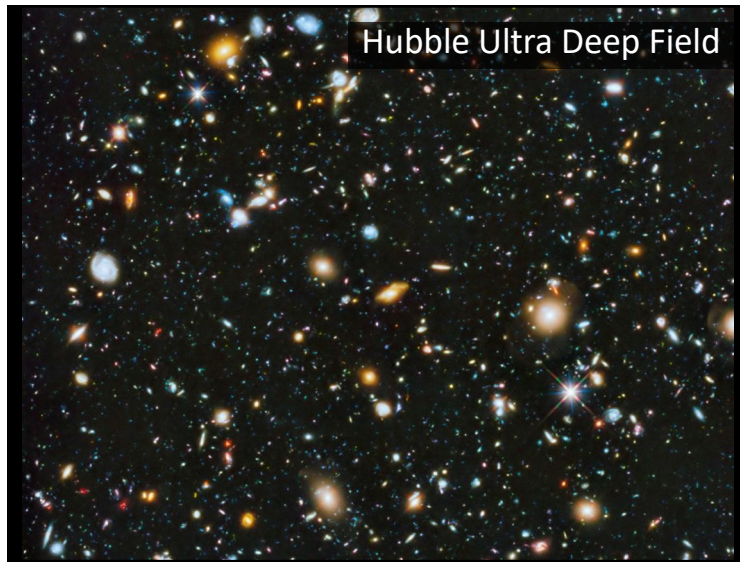


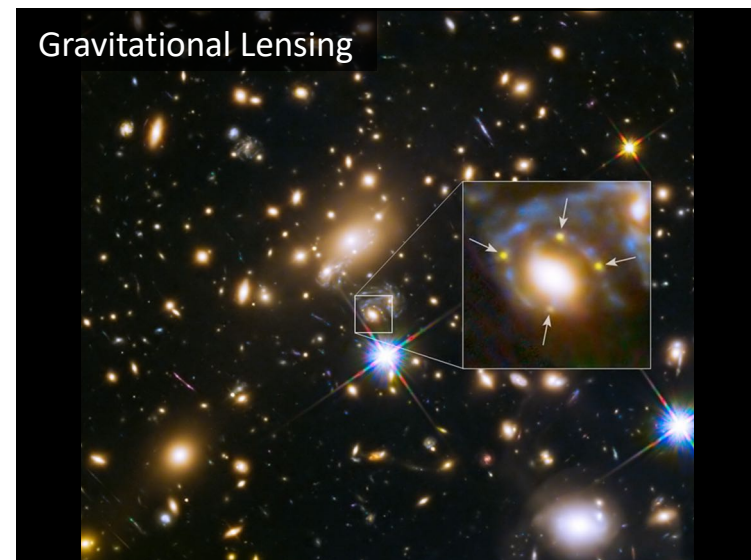
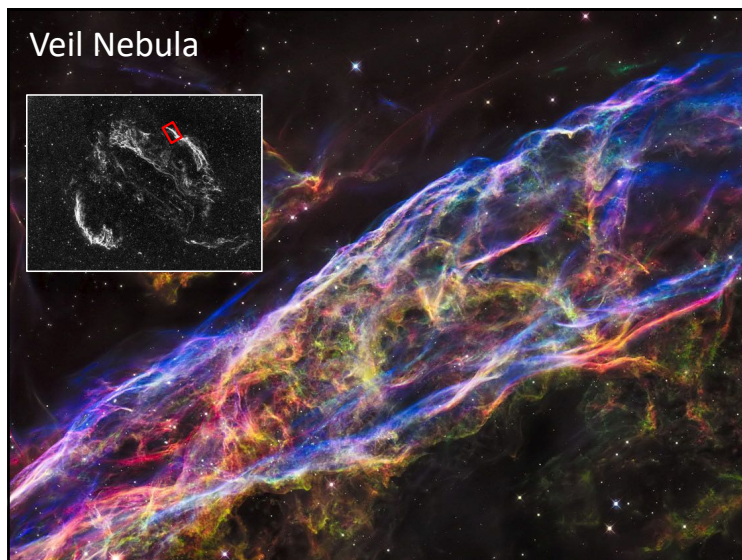
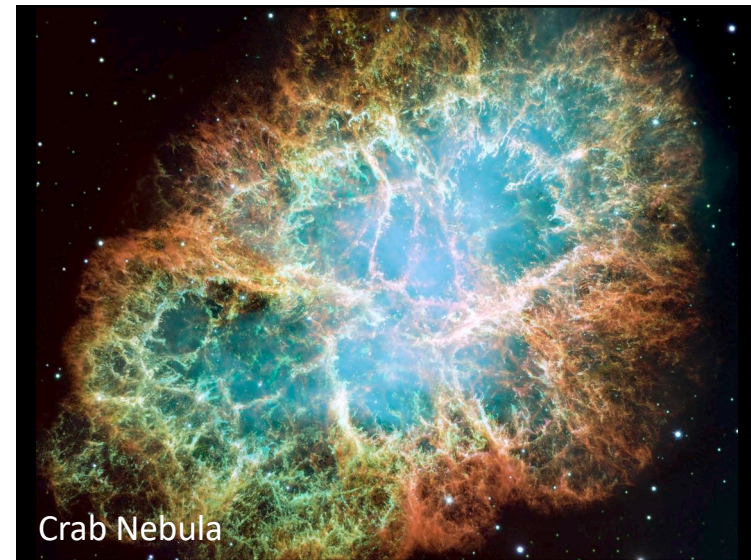
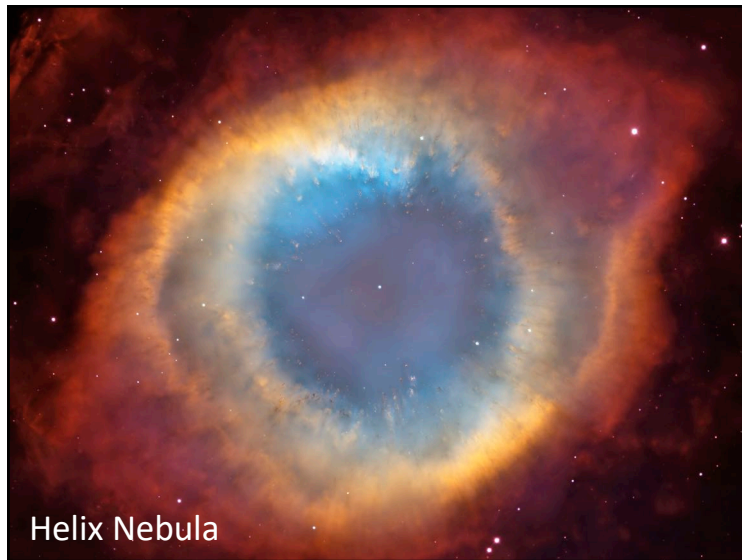
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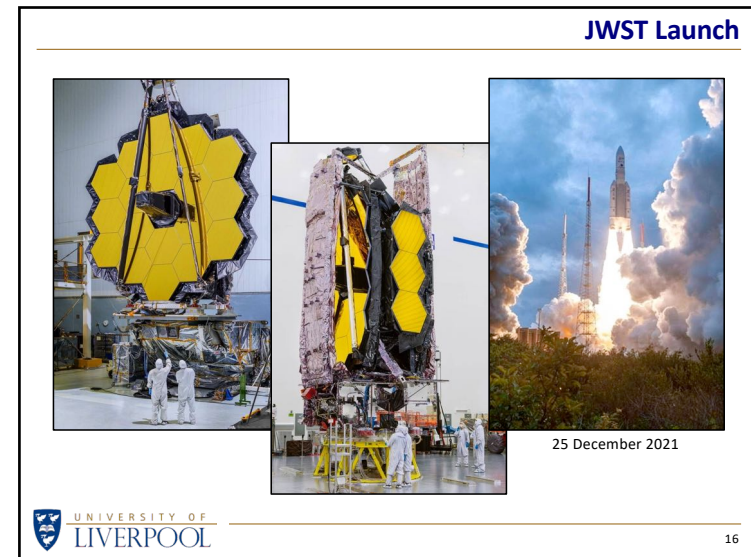
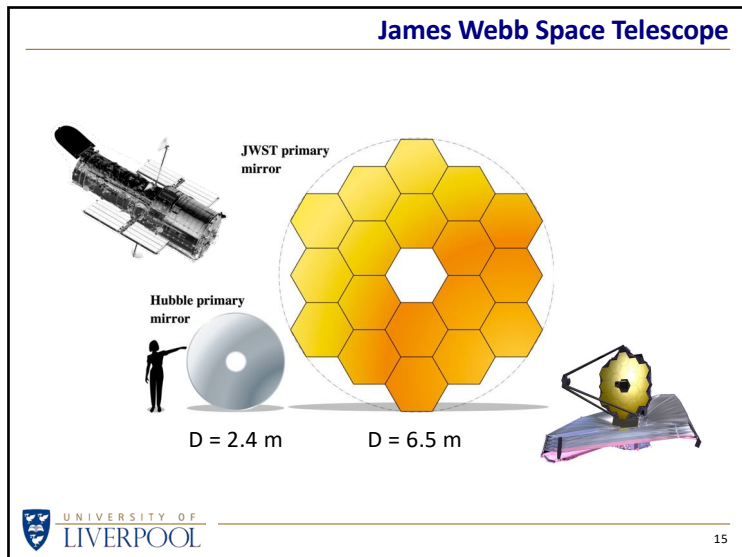
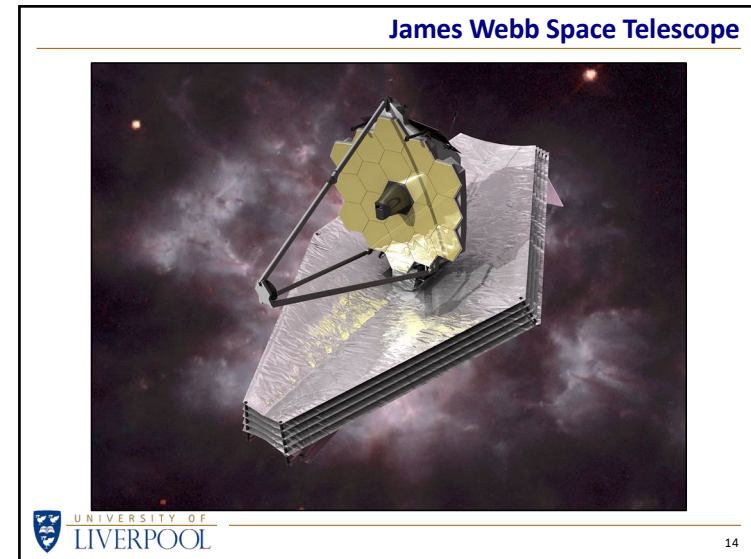
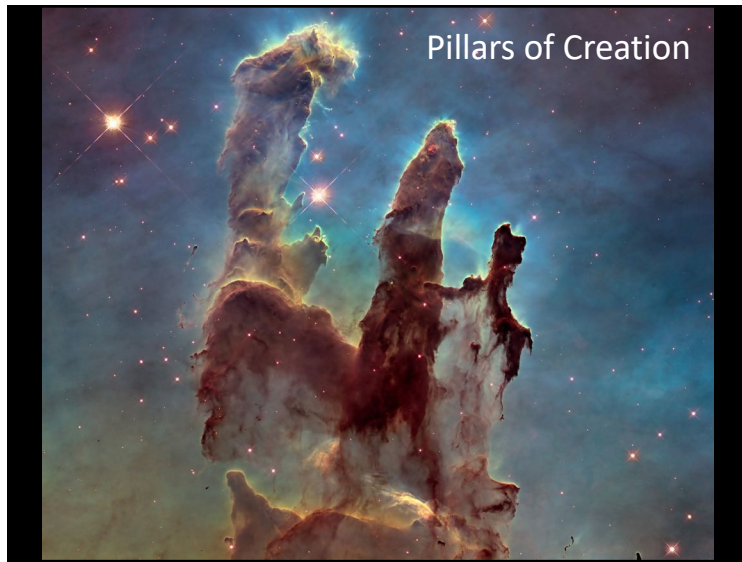
Keeping an Eye on the Universe



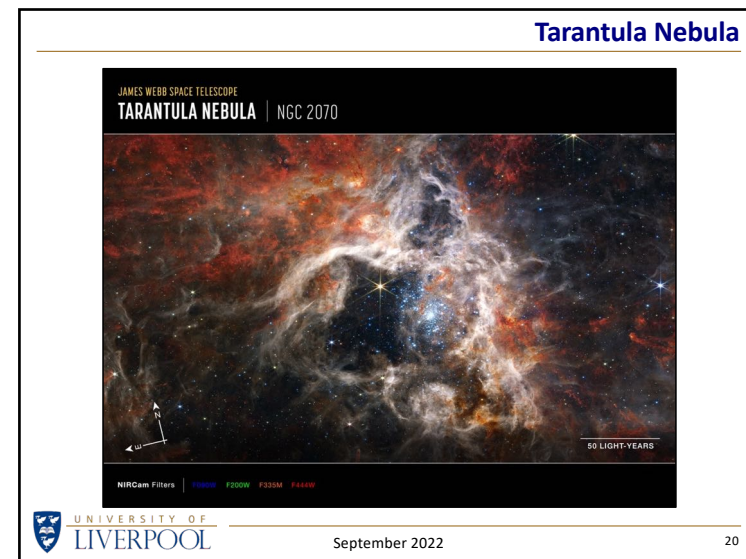
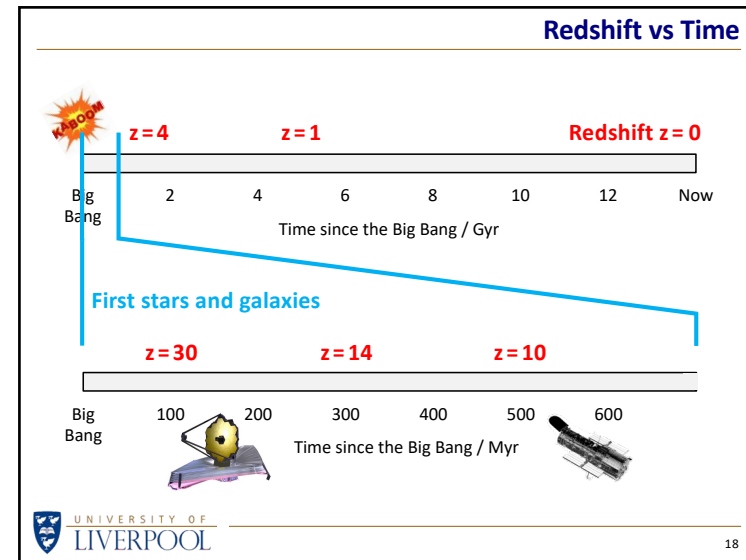
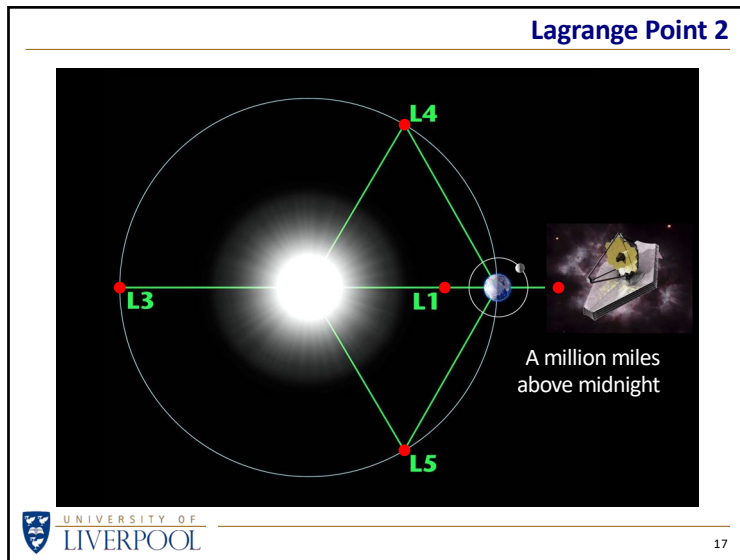
Keeping an Eye on the Universe



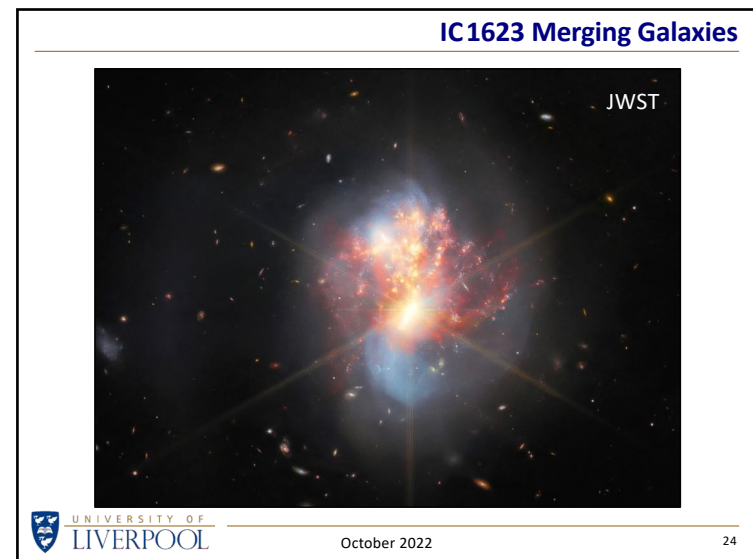
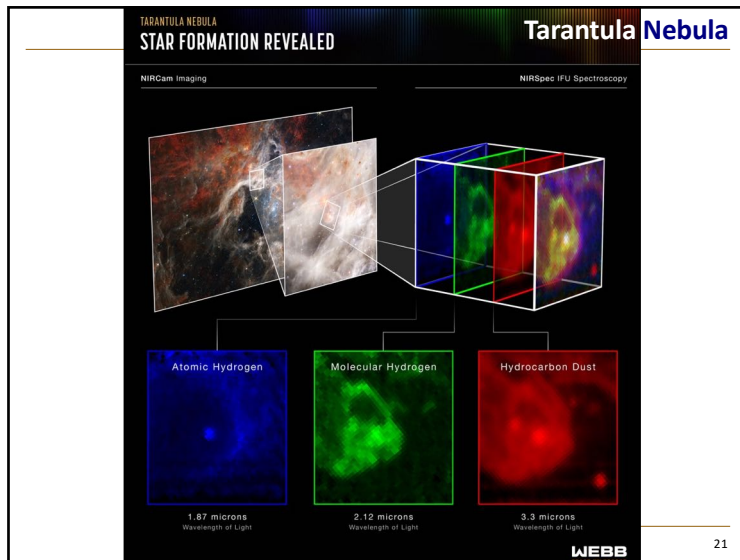
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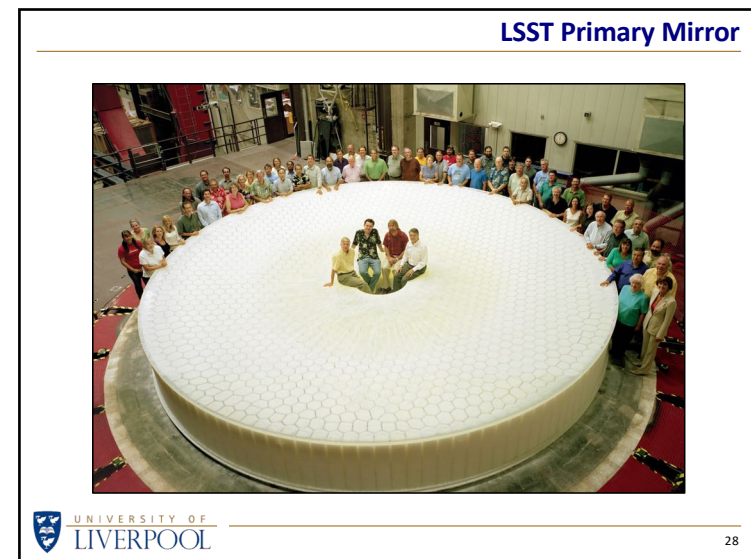
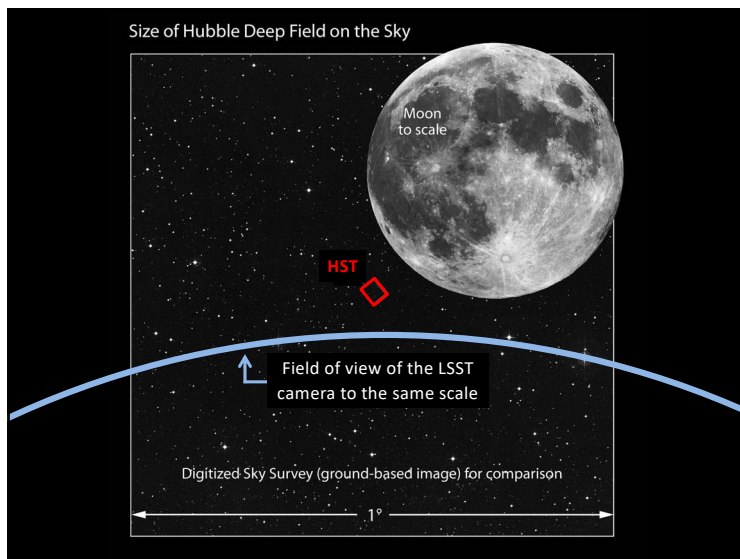
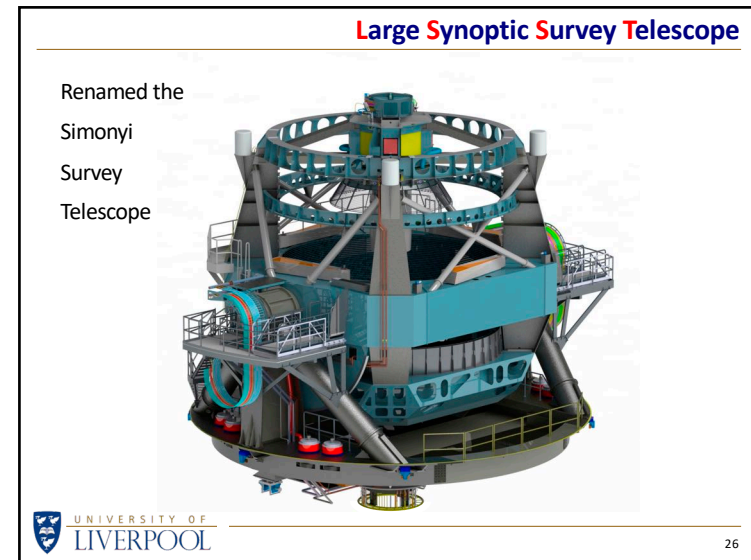
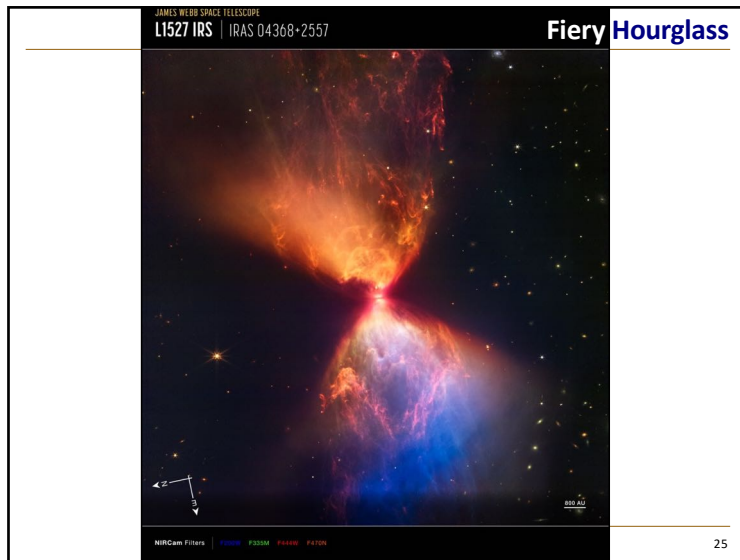
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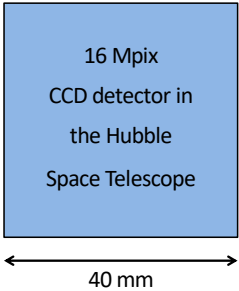
Keeping an Eye on the Universe

Camera CCD

Camera module from a mobile phone




... and at the same scale



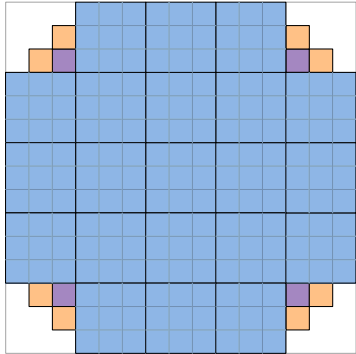
16 Mpix
CCD detector in
the Hubble
Space Telescope

40 mm

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29

LSST Camera CCD




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

Array is 0.6x0.6 m

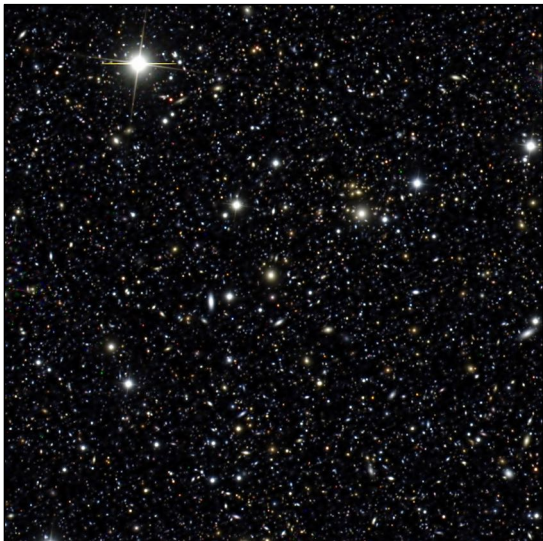
Image is 3 Gpixels

Readout in 2 sec


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30

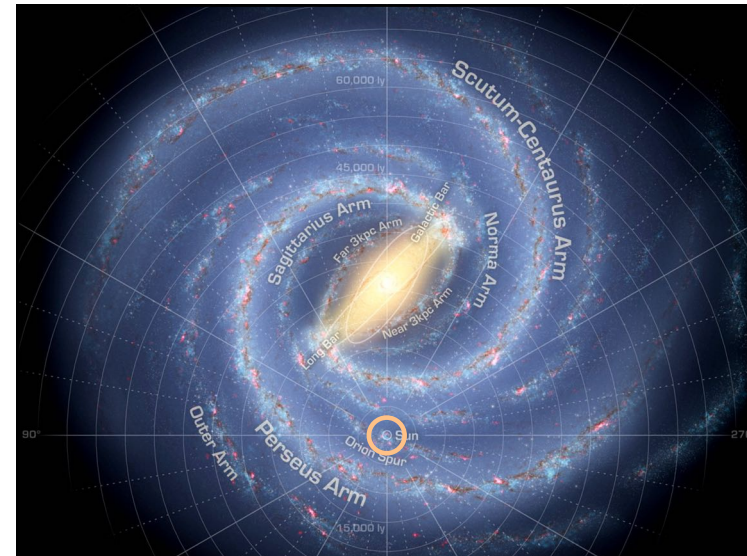
LSST Camera



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.

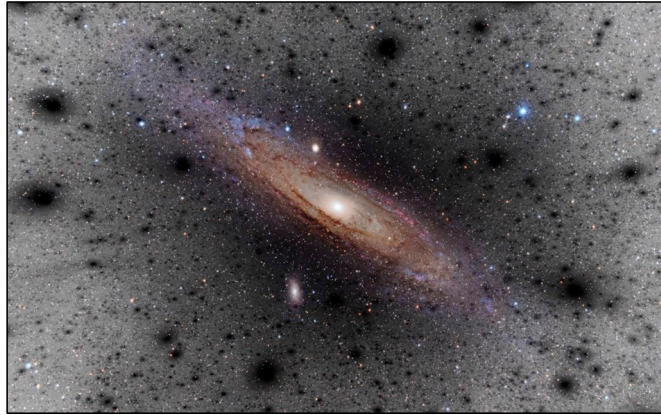
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31

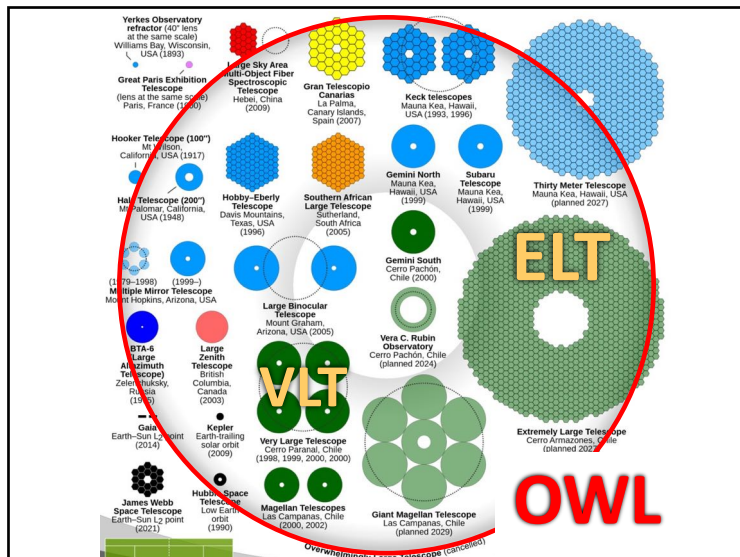
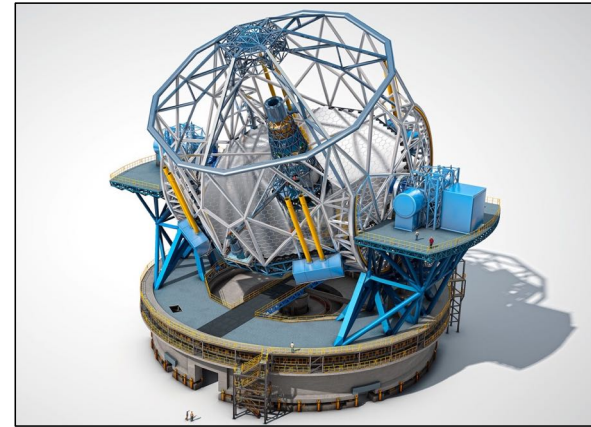


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LSST Science – Dark Matter



European Extremely Large Telescope



Keeping an Eye on the Universe

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

Dr Steve Barrett

Norton Priory 11 Jan 2024