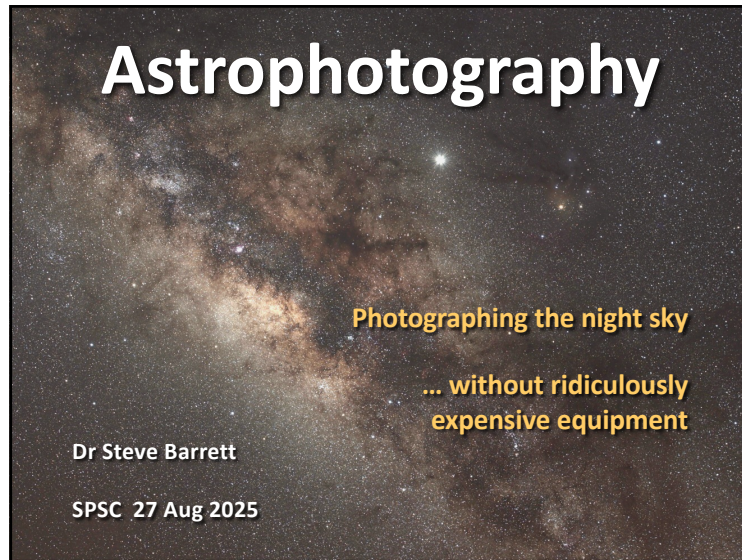



Astrophotography

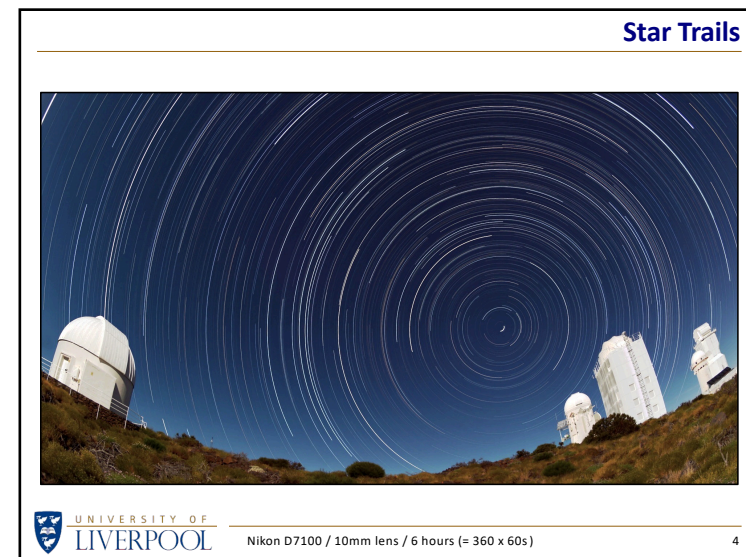


What Do You Need?

Start Simple	Just a camera and tripod
Equipment	Telescopes and mounts
Equipment	Cameras and star trackers
Photo Gallery	Some of my images
Astro Africa	Under the darkest skies

 UNIVERSITY OF LIVERPOOL

2



Astrophotography

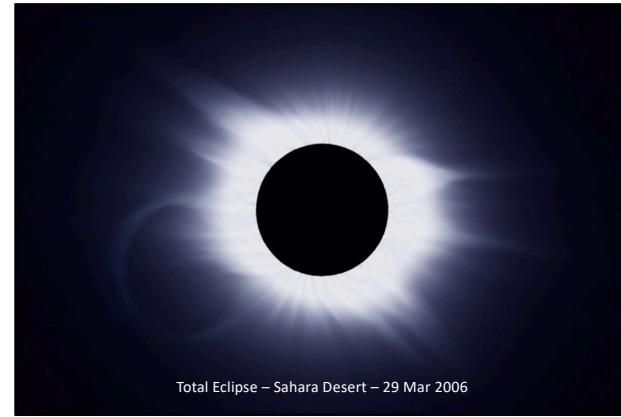
Right Place ... Right Time



Nikon FM2 / Fujichrome slide film / 24mm lens / 300s

5

Right Place ... Right Time



Total Eclipse – Sahara Desert – 29 Mar 2006



Nikon D200 / 300mm lens / Various exposures

6

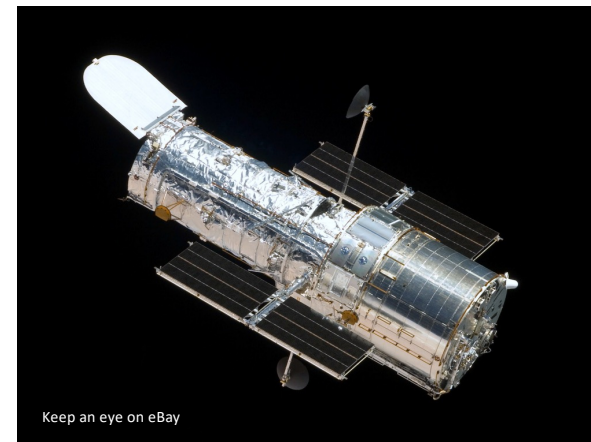
What Do You Need?

- | | |
|---------------|---------------------------|
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7

What Do You Need?



Keep an eye on eBay



8

Astrophotography

What Do You Need?

If you have a \$billion to spare ...



M51



M16

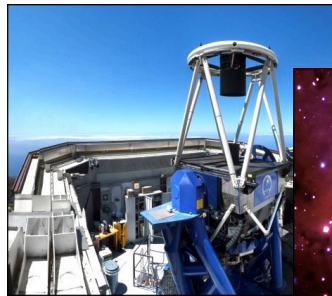
What Do You Need?

If you have a \$100 million to spare ...

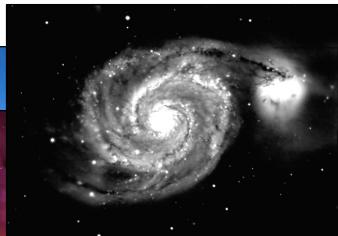


What Do You Need?

If you have ~£million to spare ...



Liverpool Telescope, La Palma



M51



M16

What Do You Need?

If you have
~£250 – £25,000
to spare ...



Astrophotography

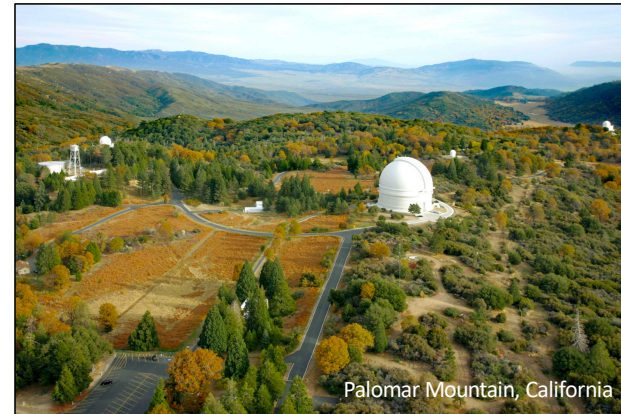
What Do You Need?

If you have
~£250 – £25,000
to spare ...



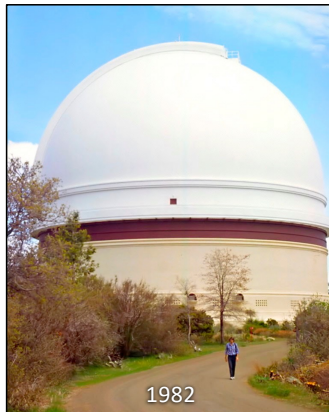
Many astronomers would
advocate the use of a telescope
mount that is the most sturdy and
most precise that you can afford.
Is this mount worth \$10,000?

Where To Put the Telescope?



Palomar Mountain, California

Back Garden Observatory

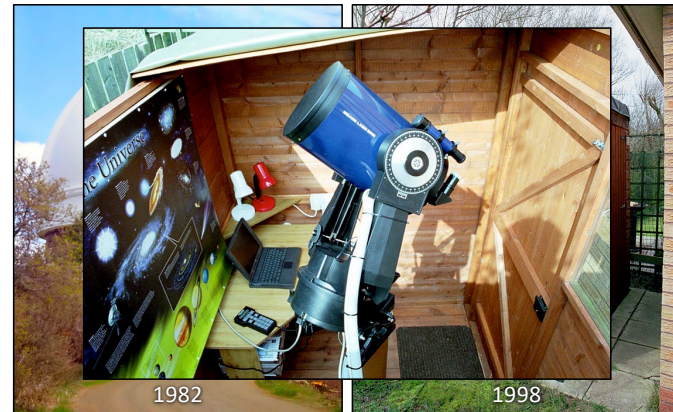


1982



1998

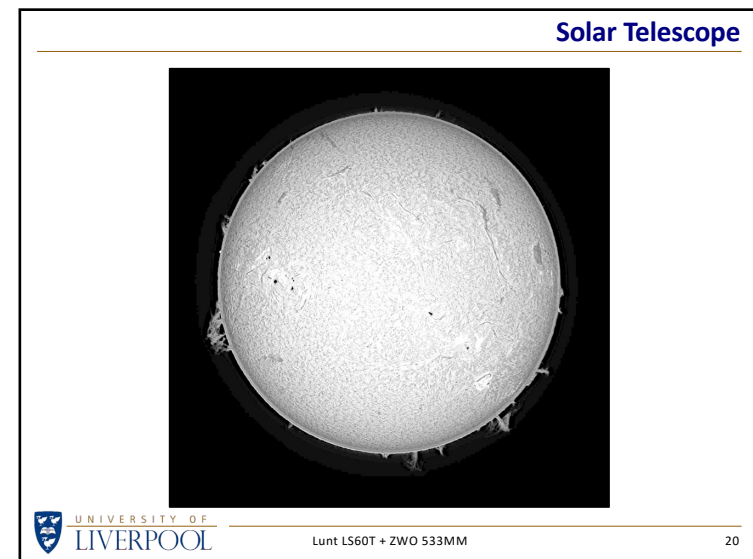
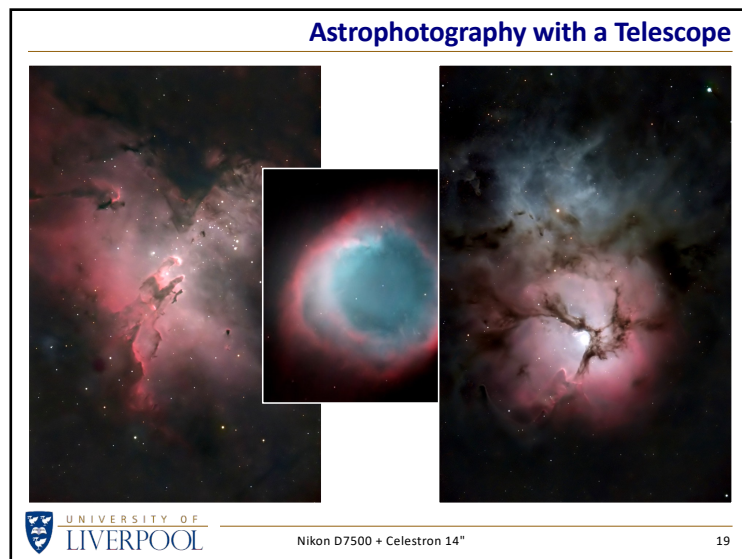
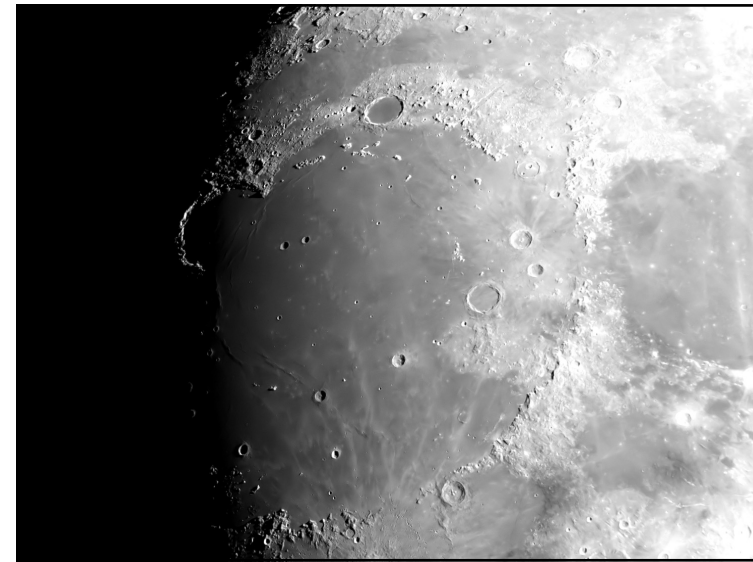
Back Garden Observatory



1982

1998

Astrophotography

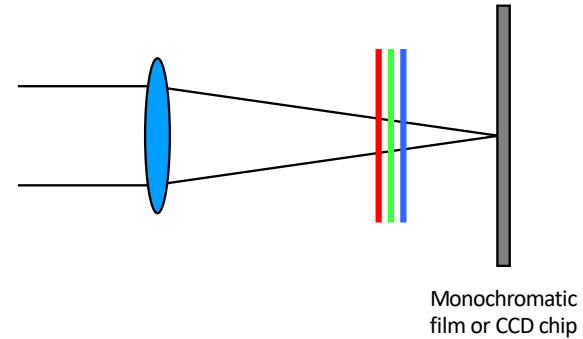


Astrophotography

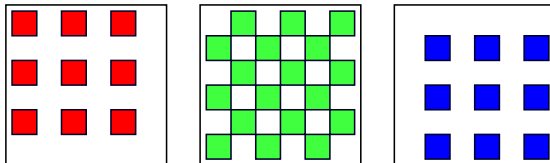
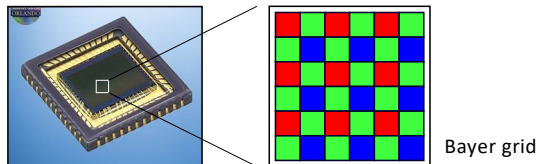
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Colour Imaging



Colour Imaging



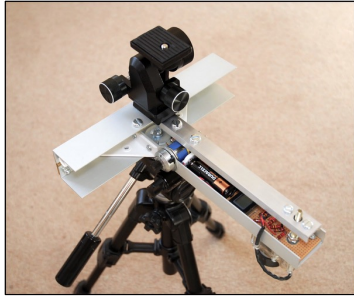
Astronomical Cameras



Already got a DSLR?
Try a star tracker ...

Astrophotography

Star Trackers

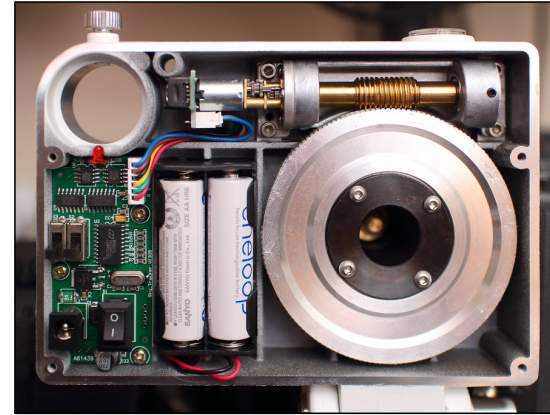


DIY star tracker 'K2' that I designed and built
Used 2007–2013

iOptron SkyTracker™
Used since 2015



Inside a Star Tracker



Star Trackers



Camera and Lens



Nikon D7500
300 mm f/4 lens



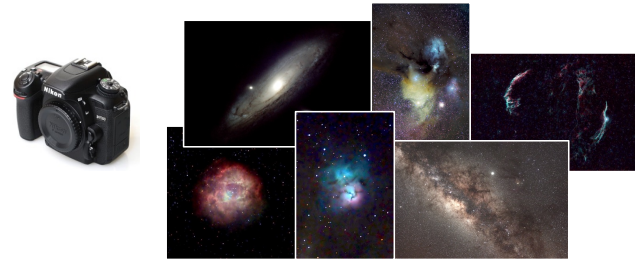
Astrophotography

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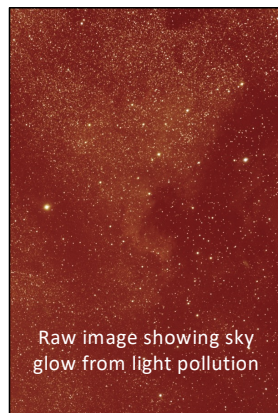
Some Of My Images

I like to take astrophotographs without using a telescope, just using a camera on a star tracker:

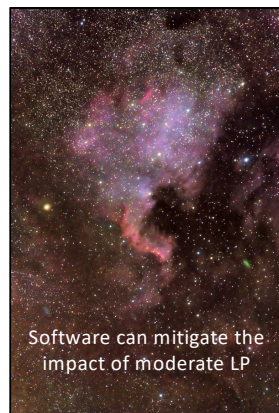


Astrophotography using a telescope can be very rewarding, but to get the most out of it will take quite a bit of time, effort and cash.

Image Processing

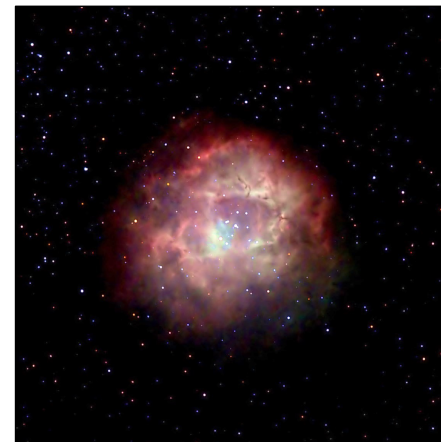


Raw image showing sky glow from light pollution



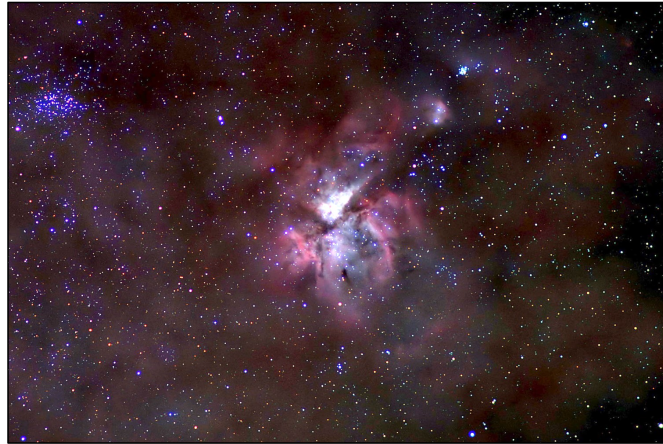
Software can mitigate the impact of moderate LP

Rosette Nebula



Astrophotography

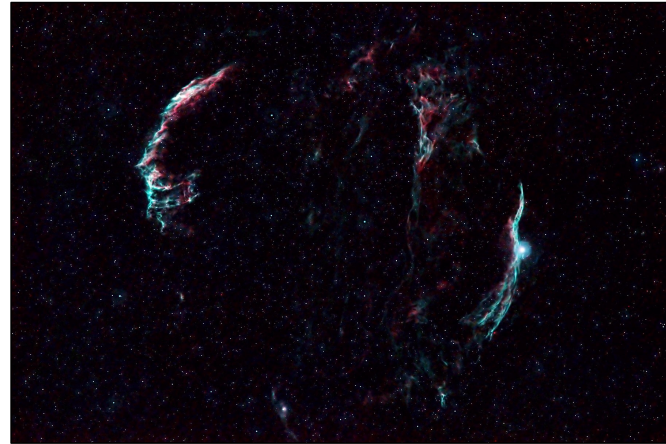
Carina Nebula



Nikon D7500 / 85mm lens / 15 x 60s

33

Veil Nebula



Nikon D7500 / 300mm lens / 60 x 60s / Tri-band

34

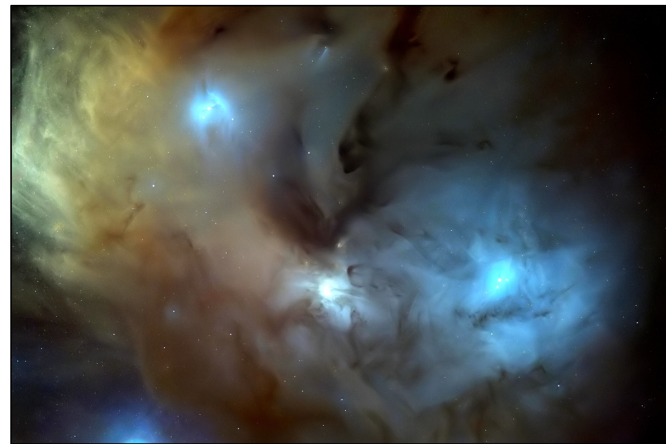
Stars and Nebulae



Nikon D7500 / 135mm lens / 60 x 120s

35

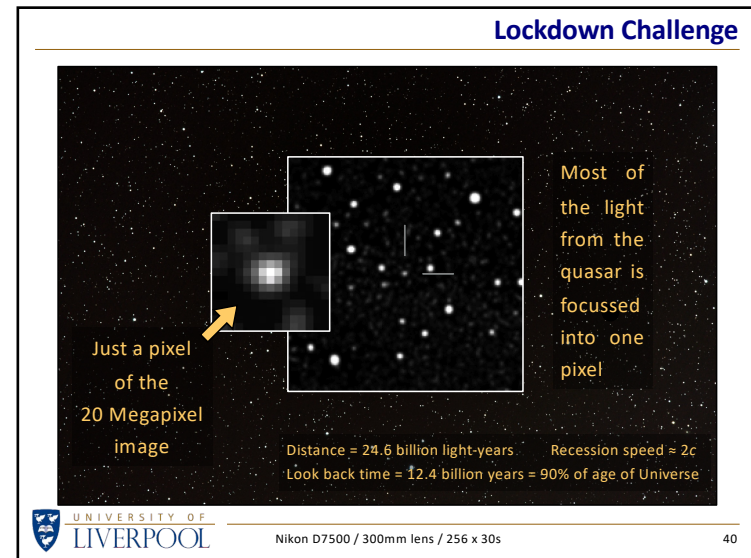
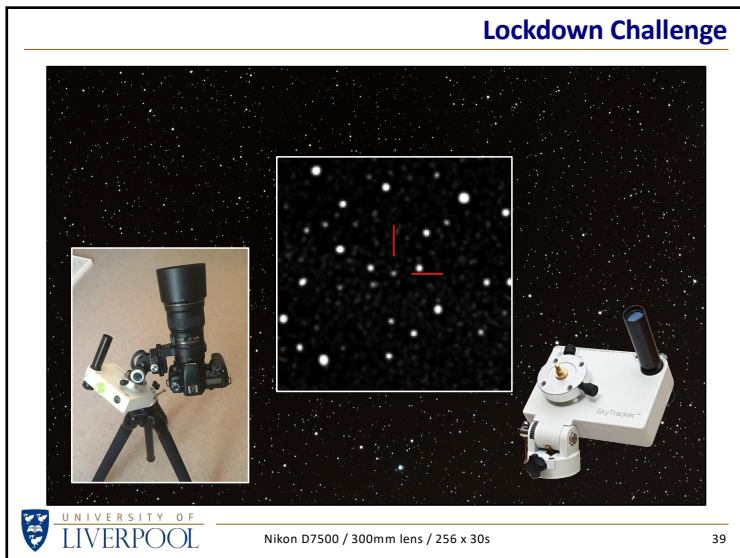
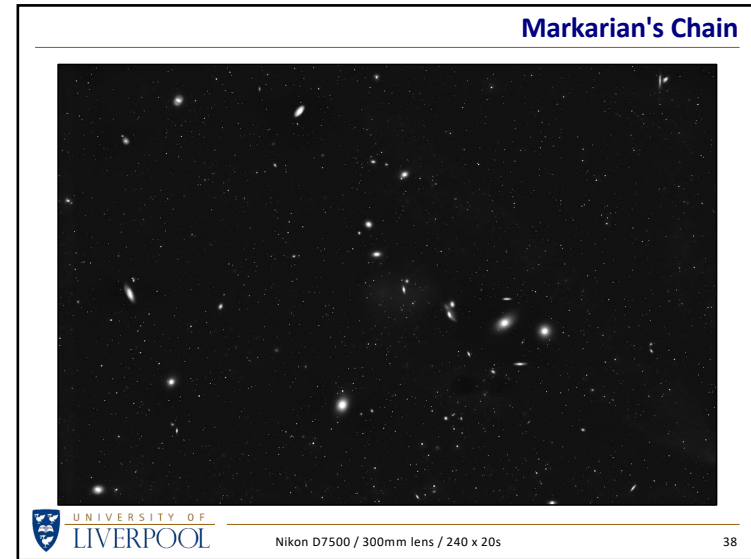
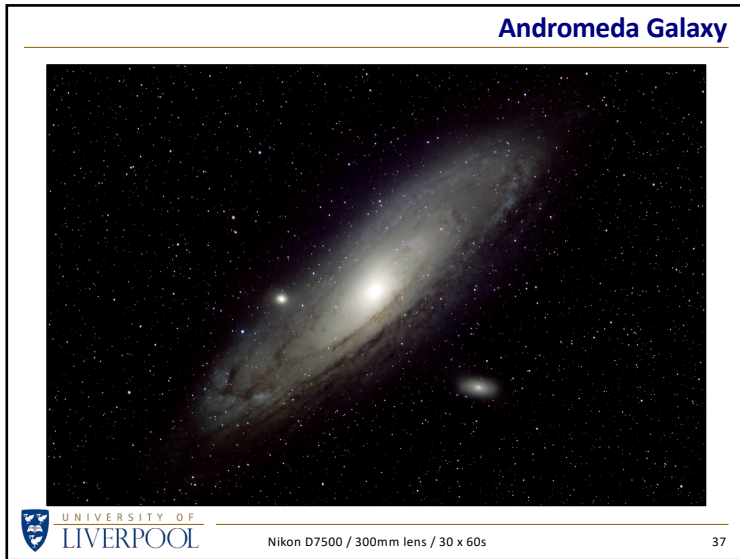
Stars and Nebulae



Nikon D7500 / 300mm lens / 150 x 60s

36

Astrophotography

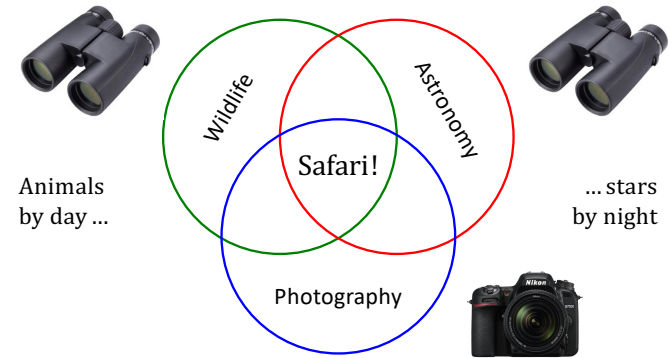


Astrophotography

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Wild Astronomy



(Sleep when you get home)

Aligning Using Polaris

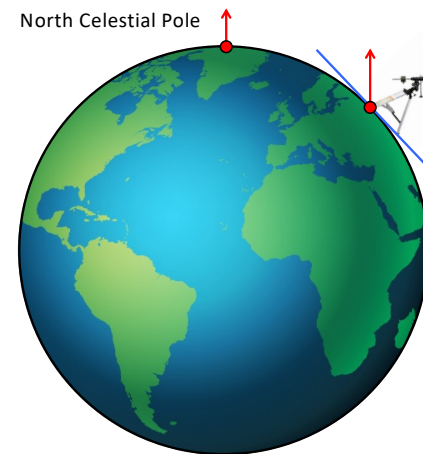
With Polaris visible, aligning a star tracker is easy in the UK.



But ...



Aligning a Star Tracker



In East Africa the NCP and Polaris are very close to the horizon, and hence are hidden behind elephants or distant hills.

Astrophotography

