

A person is sitting on a lounge chair on a balcony at night, looking up at a starry sky. A bright meteor streak is visible in the upper left corner. The balcony has a wooden railing and a green cushioned chair. The background shows some trees and a clear night sky with many stars.

Astrophotography

Without a telescope

Dr Das Baskill
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Astrophotography

Without a telescope

- Moon
- Manual camera settings
- Star-trails
- Meteors (shooting stars)
- Milky-way

The Moon

Method:

- Autofocus
- Autoexposure
- Auto f/number



The Moon



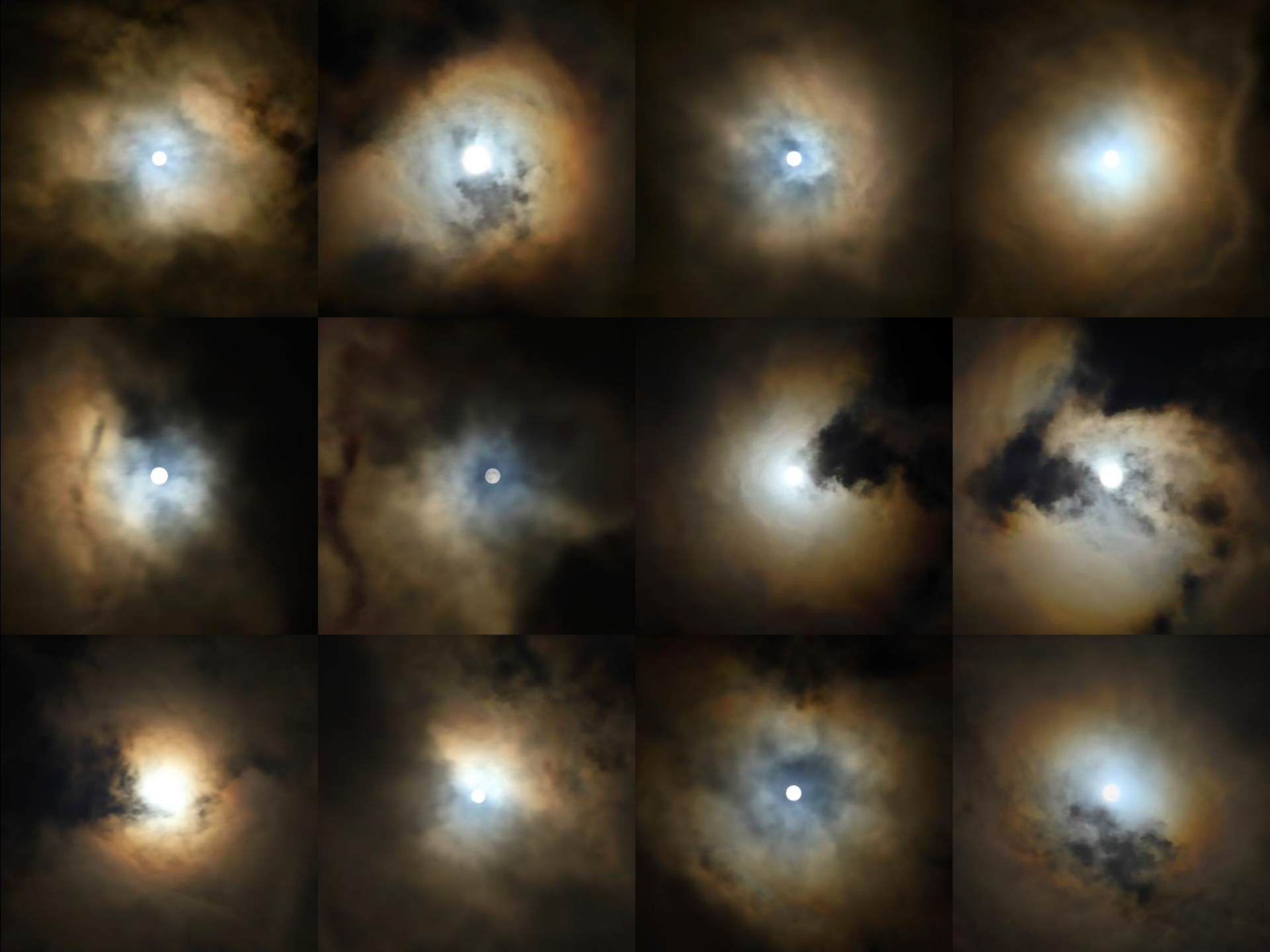
The Moon



The Moon



The Moon



Camera Settings

- Exposure time
- ISO setting
- f/number



Exposure Time

Short: $\frac{1}{8}$ seconds



Exposure Time

Longer: 2s





Exposure time: 10 hours

Camera Settings

- Exposure time

- **ISO setting**

- f/number

Increase to make the camera more sensitive to light...

But that also makes the camera more sensitive to imperfections, too.

ISO setting

ISO 100

ISO setting

ISO 200

ISO setting

ISO 400

ISO setting

ISO 800

A dark night sky with several bright, colorful stars (red, blue, green) and a faint constellation of stars. The text "ISO 800" is visible in the upper right quadrant.

ISO setting

ISO 1600



ISO setting

ISO 3200

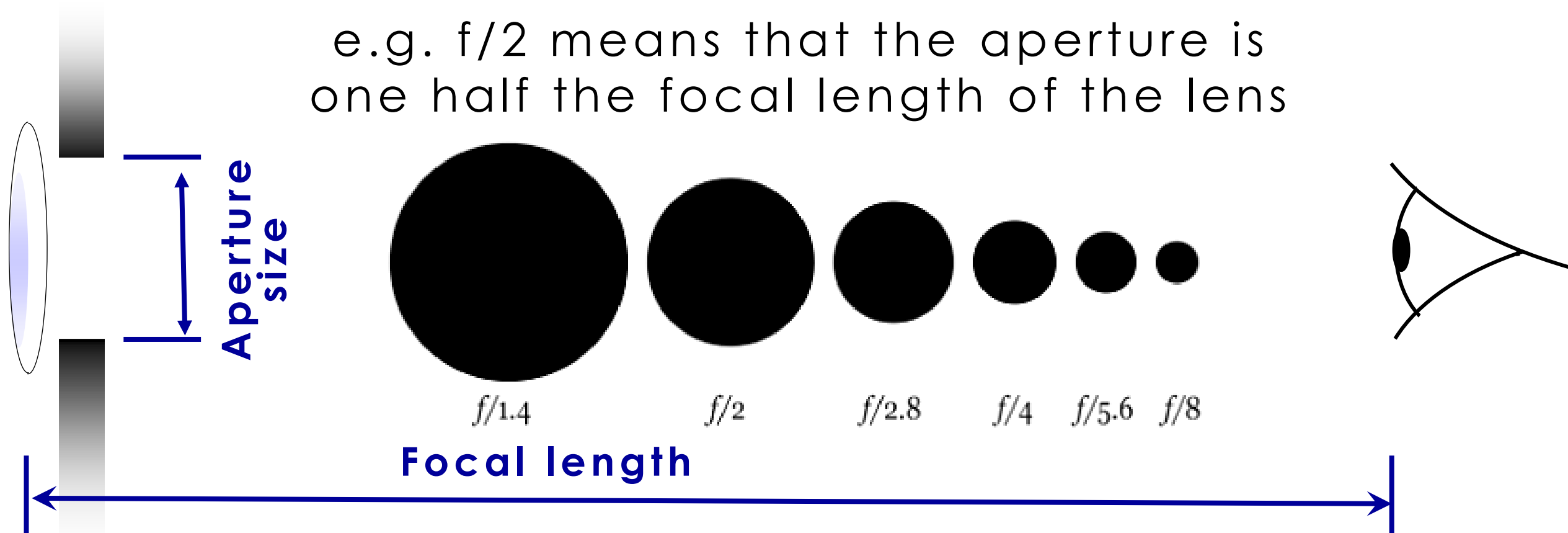
Camera Settings

- Exposure time
 - ISO setting
 - f/number
- Increase to collect more light...
- ... Or decrease to increase the depth of field or for diffraction spikes.

Camera Settings

f/number is the aperture size (opening) of a lens, in terms of Focal length

e.g. $f/2$ means that the aperture is one half the focal length of the lens



f/4.5



f/13



f/32



The Moon



30 seconds
f/32
ISO 2000

f/5.6



The Moon

f/11



Camera Settings

For shooting the Moon

- Exposure time { Can take short exposures for the bright Moon: 1/50s-1/200 s
- ISO setting { No need to be too sensitive as the Moon is bright: ISO200-800
- f/number { f/4.0 to f/13+, depending on diffraction spikes

The Moon

By Laurent Laveder

<http://www.pixheaven.net>







Moon trails & Movement



Moon trails

Trough a telescope

Exposures:

0.2 second

ISO 1600

1000mm telescope

D=200mm, so f/5

Planning with Stellarium and a map





The Moon

during a lunar eclipse

University of Sussex
Meeting House chapel

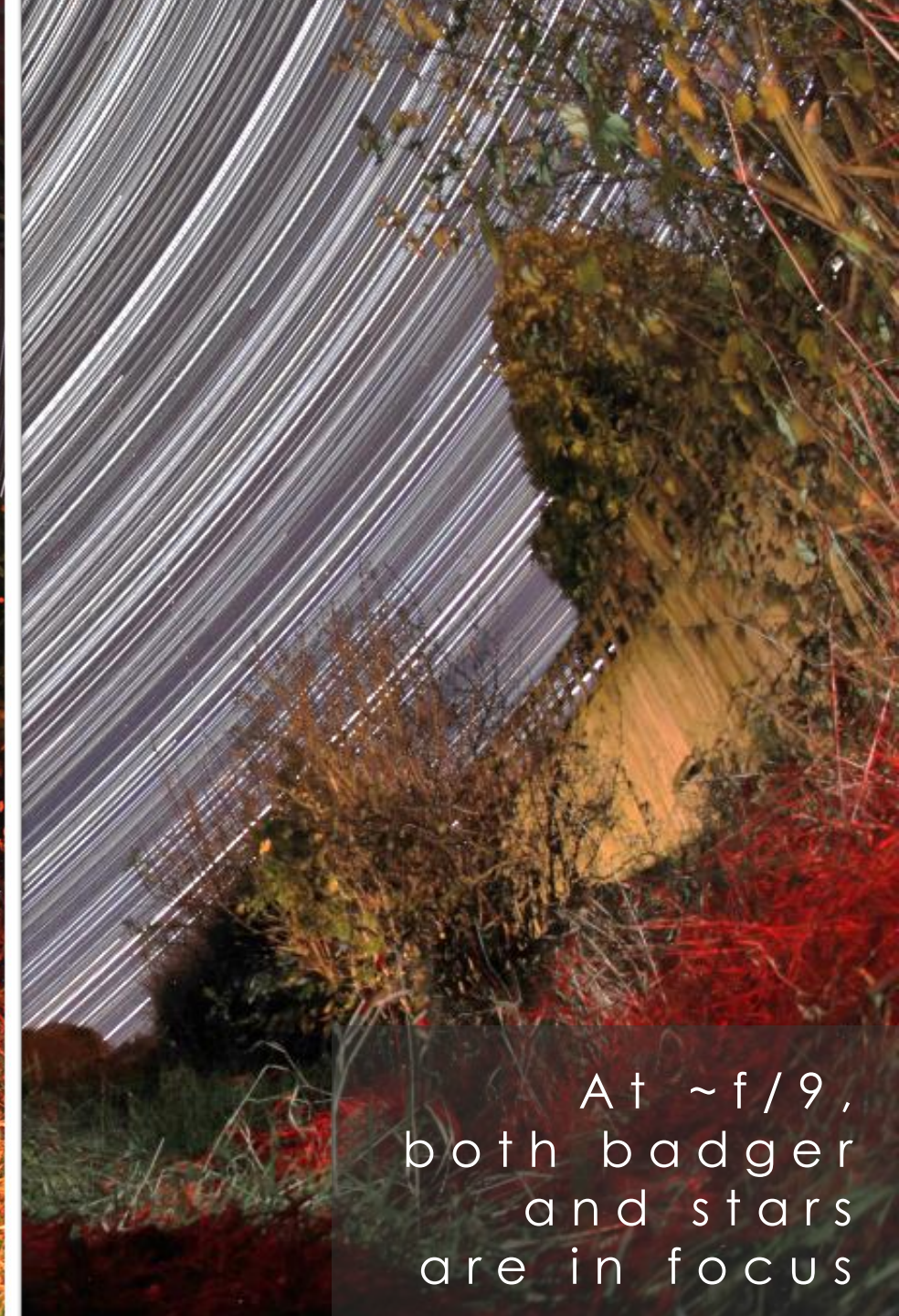
Star trails (Stacking)





Exposure

30 seconds
f/9
ISO 3200
Repeat



At ~f/9,
both badger
and stars
are in focus



Meteors

Shooting stars are very difficult to photograph!

- They're very quick
- Often faint
- And can appear anywhere in the sky

Camera settings for meteors/shooting stars

- Exposure time { ~10 seconds or until light pollution dominates...
- ISO setting { Camera needs maximum sensitivity: ISO 3200+
- f/number { Wide open aperture
e.g. f/2.8 or f/4 to allow as much light in as possible.

Meteors



Light pollution from the inefficient
lights of Brighton



Light pollution

Typical view of the night sky
from a light polluted location



Light pollution

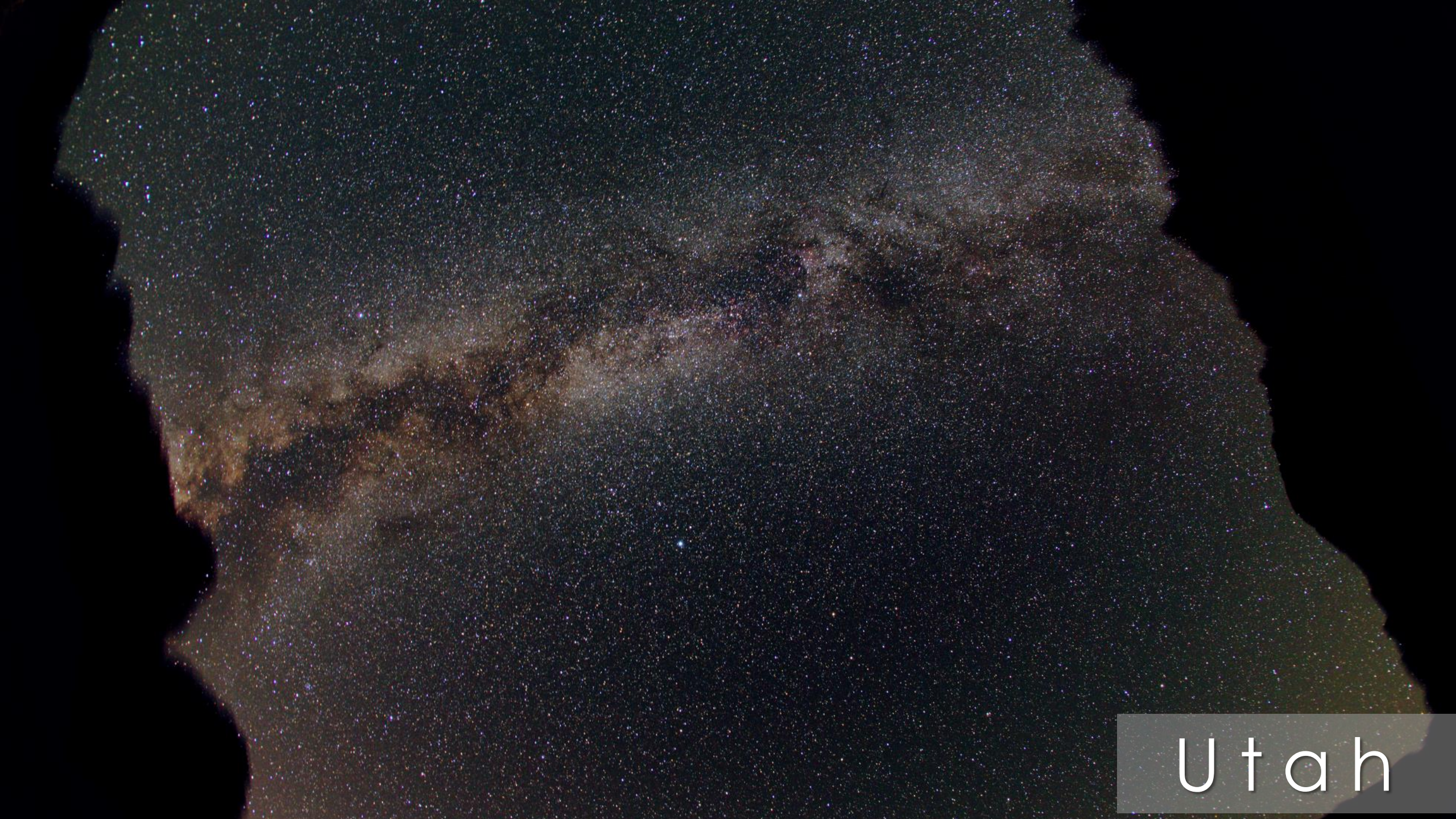
Typical view of the night sky
from a dark location



Milky way

< Andromeda
galaxy

Brighton



Utah

Mauna Kea
Hawai'i



Mauna Kea Hawai'i



A night sky photograph showing the Milky Way galaxy. The galaxy's structure is visible as a dense band of stars and dust, with a prominent reddish-pink nebula on the left. The background is filled with numerous stars of various colors and magnitudes. On the right side of the image, there is a vertical grey bar containing a list of text.

Post processing

Stacking

Brightness & contrast

Light pollution reduction



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