Astrophotography

Photographing the night sky without ridiculously expensive equipment

Dr Steve Barrett  WAG 5 Apr 2018

What can be done with a camera and ... 

... nothing else?
... a DIY star tracker?
... an amateur telescope?

Star Trails

Exp=5s  f/2.8  FL=24mm  Fujifilm ISO 200

Star Trails

Exp = 360 x 1s  f/5.6  FL = 10mm  Nikon D7200

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Comet Holmes

Exp= 90s  f/4  FL= 300mm  Nikon D200

Aurora Borealis

Exp= 5m  f/2.8  FL= 24mm  Fujichrome ISO 200

Aurora Borealis

Exp= 5m  f/2.8  FL= 24mm  Fujichrome ISO 200

Solar Eclipse

Exp= 1/300s  f/4  FL= 500mm  Nikon D200
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Tracking the Stars

How can the sky be photographed without the stars trailing?
Build a device to compensate for the Earth’s rotation – a star tracker.

Ideally... For K2 this means...
Compact   Footprint no larger than A4
Light     Less than 1 kg
Strong    Able to support a digital SLR
Accurate  Exposures of up to 15 minutes
Battery operated AA batteries
Low power Run for ~6 hours
Cheap     Cost < £50 for all components
Easy to construct Manual tools (no workshop)

K2 Star Tracker
Astrophotography

K2 Star Tracker

Tracking the Stars
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Star Trackers

Milky Way

Image of the Milky Way taken with a 10mm wide-angle lens. 6 exposures of 4 minutes each.

Milky Way

Image of the Milky Way taken with a 85mm lens. M13, M11, Messier 28, and Orion visible.

Telescopes

Exp = 5 x 4min  f/5.6 FL = 10mm Nikon D7100

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Helix Nebula

NGC7000 North America Nebula

Märkarian's Chain

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Image Processing

Deep Sky Photography

Summary

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