August 21, 2017 Total Solar Eclipse
by
Melissa Kirk

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Equipment Setup

- 6-inch Schmidt-Cassegrain f/10 Telescope, using an f/6.3 focal reducer, and broadband solar filter with 1/1000th of 1% transmission
- Digital astrophotography camera behind a star diagonal.
Sunspots AR2671 and AR2672

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- ISO 50, 1/40 second exposure duration.
- Photo taken from Glendo State Park, WY, prior to totality.
Chromosphere

- Filaments are dark, thread-like features seen in hydrogen alpha light.
  - They are dense, somewhat cooler clouds of material suspended above the photosphere by magnetic field loops.
- Prominences are filaments seen projecting out above the limb.
- https://solarscience.msfc.nasa.gov
- ISO 200, 1/2000 second exposure, 8-inch Schmidt-Cassegrain Telescope with focal reducer, f/5.9 overall focal ratio
- Photo taken from Guernsey, WY

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paul@shubertnm.net
Coronal Features

• Helmet streamers are large cap-like coronal structures with long, pointed peaks. They get their shape from
  - Large, active regions having magnetic fields penetrating the chromosphere and reconnecting into magnetic systems in the corona.
  - Outflowing gas or plasma in the corona or solar wind drawing them out into radial, linear features at several million kilometers from the photosphere.
• https://eclipse2017.nasa.gov/helmet-streamers
• ISO 200, 1/25 second exposure duration
Polar Plumes

- Polar plumes are long, thin streamers projecting outward from the Sun’s magnetic North and South Poles.
  - They are associated with the “open” magnetic field lines at the poles.
  - Bright areas at the bases of the plumes are associated with small magnetic regions on the photosphere.
  - They are formed by the solar wind in much the same way as the peaks of the helmet streamers.
- [https://eclipse2017.nasa.gov](https://eclipse2017.nasa.gov)
  [https://solarscience.msfc.nasa.gov/](https://solarscience.msfc.nasa.gov/)
Environmental Effects

- 360° horizon glow during totality
- Sudden darkening upon the start of totality
- Waxing phase crescents projected
- Obvious, palpable temperature changes
- Photos taken by Whitson John Kirk III.