

## Eye Protection/Safety for Solar Eclipse on August 21, 2017

On 21 August 2017 Fort Campbell, KY will experience a total solar eclipse, when the moon completely blocks the sun's face during daytime hours. During the eclipse, the sun will transition through several phases of brightness, none of which diminish the emitted radiation. The radiation from the sun is what causes eye injuries for people attempting to view an eclipse without proper eye protection.

Viewing a solar eclipse without protective eyewear can damage the retina (light-sensitive nerve cells) of the eye, resulting in temporary or permanent blindness. The retina does not register pain, and the effects of radiation damage to the retina may not appear for hours, so there is no warning that injury is occurring. To avoid eye injuries, people viewing the eclipse should wear filtered glasses or use eclipse viewers that are specifically designed for separating out the damaging radiation from the sun.

Filtered glasses or hand held viewers with an International Organization for Standardization (ISO) 12312-2 certification or welder's glasses with a rating of #14 from the American National Standards Institute (ANSI) Z87.1, American National Standard for Occupational and Educational Personal Eye and Face Protection Devices, 2015, are the only safe way to view a solar eclipse.

Personnel should view the Eclipse in accordance with, ISO 12312-2:2015 (Eye and face protection — Sunglasses and related eyewear — Part 2: Filters for direct observation of the sun, 2015). Specific instructions on the use of eye protection during the eclipse phases can be found at <https://www.nasa.gov/content/eye-safety-during-a-total-solar-eclipse> and in the following pages 2-4.

For more information call (270) 412-4252 or email the Division Surgeon at [usarmy.campbell.101-abn-div.mbx.division-surgeon@mail.mil](mailto:usarmy.campbell.101-abn-div.mbx.division-surgeon@mail.mil).

More safety tips and local information is also available on Facebook @BACH.Fort.Campbell, @fortcampbellcourier and @fortcampbell.

## NASA: Eye Safety During a Total Solar Eclipse

It is never safe to look directly at the sun's rays – even if the sun is partly obscured. When watching a partial eclipse you must wear eclipse glasses at all times if you want to face the sun, or use an alternate indirect method. This also applies during a total eclipse up until the time when the sun is completely and totally blocked.

During the short time when the moon completely obscures the sun – known as the period of totality – it is safe to look directly at the star, but it's crucial that you know when to take off and put back on your glasses.

First and foremost: Check for local information on timing of when the total eclipse will begin and end. NASA's page of eclipse times is a good place to start.

Second: The sun also provides important clues for when totality is about to start and end. Risk of eye damage changes as the eclipse moves through its phases. The following graphics describe those phases and when eye protection should be employed:

As the moon moves in front of the sun, there comes a time when several bright points of light shine around the moon's edges. Known as Baily's Beads (Figure. 1), these are light rays from the sun streaming through the valleys along the moon's horizon.



Figure 1: Baily's Beads. Credits: © 2005 Miloslav Druckmüller (used with permission)

As the moon continues to move, the extent of these beads diminish (Figure. 2), until there is only one. The last bead is a bright spot that, with the sun's atmosphere, is still visible around the moon looks like a giant diamond ring - it is not safe to look at the sun. You can safely look at the sun only when the bright spot disappears completely.

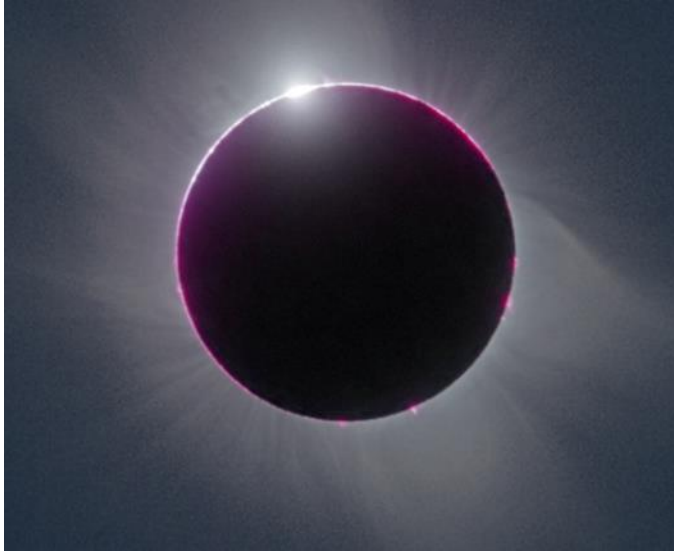


Figure 2. Diminished Bailey's Beads with Diamond Formation (upper left). Credits: © 2005 Miloslav Druckmüller (used with permission)

Once the bright "diamond" disappears (Figure 3) and there is no longer any direct sunlight coming toward you, you may look at the total eclipse safely. But you must still be vigilant and make sure you use your glasses or viewer again before the end of totality. The entire total eclipse may take only one (1) to two (2) minutes.

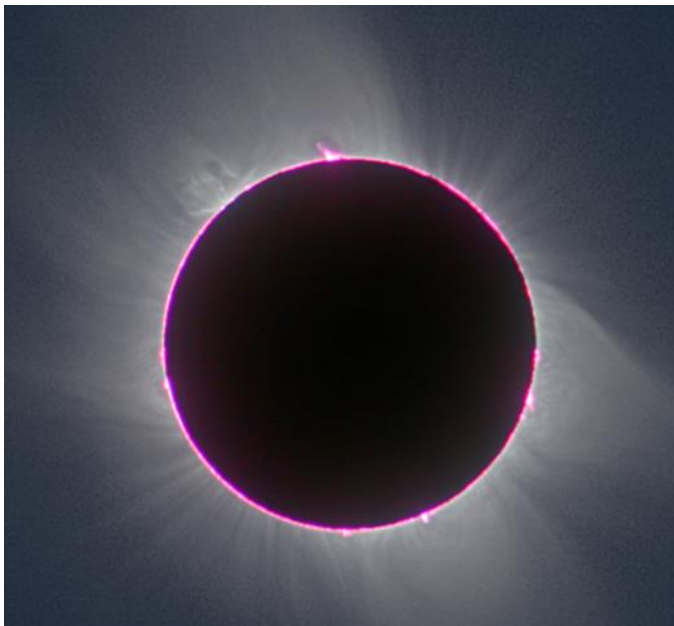


Figure 3. No Direct Sunlight. Credits: © 2005 Miloslav Druckmüller (used with permission)

As the moon continues to move across the face of the sun, a crescent will begin to grow larger on the opposite side from where the Baily's Beads were at the beginning (Figure 4). This crescent is the lower atmosphere of the sun, showing from behind the moon

and it is your signal to stop looking directly at the eclipse. Make sure you have your safety glasses back on – or are otherwise watching the eclipse through a safe, indirect method – before the first flash of sunlight appears around the edges of the moon.

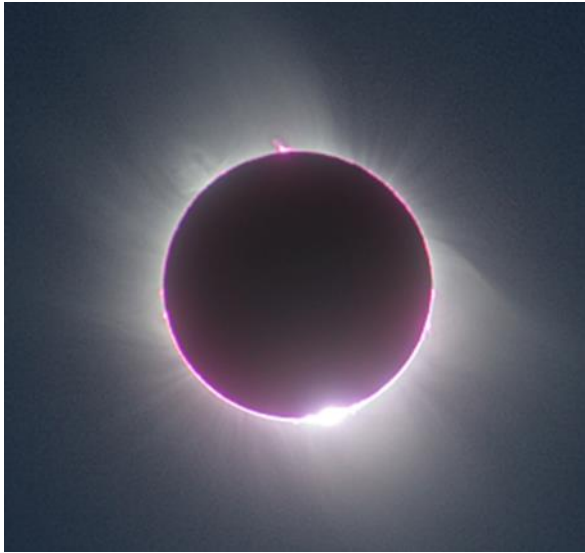


Figure 4. Diamond Formation Reappears (lower right). Credits: © 2005 Miloslav Druckmüller (used with permission)

Once your eyes are protected again, you may continue to watch the final stages of the eclipse as the end process mirrors the beginning: You will once again see a diamond ring and then the Baily's Beads, before the entire sun is visible again.