



Key words: Zodiacal light, Gegenschein, Ecliptic.

ESOCast Episode 82: Zodiacal Light	
<p>00:00 [Intro] 1. The Atacama Desert in northern Chile is famed for its dark night skies, which can be enjoyed in their full glory thanks to the absence of light pollution.</p> <p>But even the darkest sky is not completely dark. Astronomers at ESO's observatories often encounter a natural light phenomenon above ESO's telescopes known as the zodiacal light.</p>	<p>[Visuals start] Atacama desert, various timelapses</p> <p>Night timelapse with zodiacal light at end of sequence</p>
<p>00:31 ESOCast intro 2. This is the ESOcast! Cutting-edge science and life behind the scenes at ESO, the European Southern Observatory. Exploring the ultimate frontier with our host Dr J, a.k.a. Dr Joe Liske.</p>	<p>ESOCast introduction</p>
<p>00:52 [Dr J: Studio] 3. Hello and welcome to another episode of the ESOcast!</p> <p>ESO's observatories are such incredibly dark sites that normally the only thing that illuminates them on a moonless night is the faint light from the billions of stars in the Milky Way.</p> <p>But there are a number of other interesting phenomena that can be observed in the skies above the telescopes. These include, for example, the faint veil of airglow, and the occasional appearance of red sprites above the odd distant thunderstorm.</p> <p>And then, every night, especially in the hours</p>	<p>Dr J in virtual studio. Background image: Timelapses</p> <p>Various night timelapses on different phenomena seen in the night sky.</p> <p>Image of zodiacal light</p>

<p>just after dusk or before dawn, this faint, fuzzy column of light appears in the sky, just above the horizon, extending upwards. This ghostly glow is known as zodiacal light.</p>	
<p>01:39 [Narrator] 4. Shortly after sunset, just as stars begin to appear in the sky, the first hints of zodiacal light also become visible.</p> <p>As darkness sweeps over the desert, this light becomes more prominent and can be seen as a bright column of light reaching up from the horizon. This luminous column follows the starry background across the sky, eventually disappearing below the horizon as the Earth rotates on its axis.</p> <p>Even after the brightest part of the zodiacal light has dropped below the horizon, traces of it are still present. Although it now resembles an extremely faint wispy bridge that brightens again in the early morning, just before daybreak.</p>	<p>Images showing zodiacal light</p>
<p>02:32 [Narrator] 5. The origins of zodiacal light are to be found in the inner Solar System. The Sun is surrounded by tiny grains of ice and dust, that are constantly being replenished by crumbling icy comets and colliding asteroids. These grains are distributed within the same flat disc of space inhabited by the planets.</p> <p>When viewed from Earth this disc appears as a narrow path across the sky, called the ecliptic, which the Sun, Moon and planets all appear to follow as they move in the sky.</p>	<p>Computer animation of origins of zodiacal light</p>
<p>03:15 [Dr J: Studio] 6. Zodiacal light is created when light coming from the Sun is scattered forwards off the particles in this disc in the direction of Earth. When viewed from Earth, this creates the appearance of a continuous band of light along the ecliptic, that gets fainter as you look further away from the Sun.</p>	<p>Dr J in virtual studio. Background image: Computer animation of zodiacal light</p>

<p>The constellations of the Zodiac of course also lie along the ecliptic, and that's why we call this ghostly glow zodiacal light.</p>	<p>Night sky with graphical display of the constellations of the Zodiac</p>
<p>03:49 [Narrator] 7. Along the the ecliptic, high in the sky, an oval patch of illumination can also appear, known as Gegenschein or counter-glow.</p> <p>Named by the German explorer Alexander von Humboldt, this phenomenon is created by sunlight that is scattered backwards off interplanetary dust particles. It can be seen at the point in the sky opposite the Sun.</p> <p>A similar phenomenon can be experienced here on Earth. When you turn your back to the Sun in foggy weather, a halo of light called a glory sometimes appears around your shadow on the ground.</p>	<p>Images showing the Gegenschein phenomenon</p> <p>Timelapse showing a glory</p>
<p>04:32 [Dr J: Studio] 8. The zodiacal light phenomenon seems to have been first investigated in the late 1600s, by the Italian astronomer Giovanni Cassini and the Swiss mathematician Nicolas Fatio de Duillier. They were absolutely fascinated with this light in the sky and, of course, back in the 17th century, there was very little light pollution, and so for them it was relatively easy to observe this phenomenon, even from cities.</p>	<p>Dr J in virtual studio. Background image: Images of Giovanni Cassini and Nicolas Fatio de Duillier</p>
<p>05:00 [Narrator] 9. Modern observations have shown that the Solar System might not be the only one to exhibit zodiacal light. Data from the Very Large Telescope Interferometer at ESO's Paranal Observatory has revealed that numerous other planetary systems are also surrounded by interplanetary dust.</p>	<p>Various Timelapses</p> <p>Computer graphics of zodiacal light seen from an exoplanet</p>
<p>05:27 [Dr J: Studio]</p>	

<p>10 . Zodiacal light is a really photogenic feature and so it's no surprise that it's become a popular subject for night-time photographers in the Atacama Desert.</p> <p>The fact that it's so prominent at ESO's observatories is a beautiful demonstration of how incredibly good the observing conditions at these sites actually are.</p> <p>This is Dr J signing off for the ESOcast. Join me again next time for another cosmic adventure.</p>	<p>Dr J in virtual studio. Background image: Zodiacal light visuals</p>
<p>05:52 [Outro]</p>	<p>ESOcast is produced by ESO, the European Southern Observatory.</p> <p><i>ESO builds and operates a suite of the world's most advanced ground-based astronomical telescopes.</i></p>