

CREPUSCULAR RAYS AROUND THE WORLD

Those beams of light shooting out from the horizon or down from the clouds are called crepuscular rays, or sunrays. Beautiful, mysterious and very noticeable. Crepuscular means like twilight or dim. That's a clue that this effect is often seen around sunrise or sunset, when the sky is somewhat dark. Crepuscular rays may appear to fan across the sky, but the rays are really parallel to each other. They appear to diverge, much as a road that looks narrow in the distance appears wide beneath your feet. Airborne dust, droplets of water and the air molecules themselves are what make the sunrays visible. Next time you see them, remember to turn around. You might be in luck and see fainter and less noticeable anticrepuscular rays.

Crepuscular rays in atmospheric optics, are rays of sunlight that appear to radiate from the point in the sky where the sun is located. These rays, which stream through gaps in clouds (particularly stratocumulus) or between other objects, are columns of sunlit air separated by darker cloud-shadowed regions. Despite seeming to converge at a point, the rays are in fact near-parallel shafts of sunlight, and their apparent convergence is a perspective effect (similar, for example, to the way that parallel railway lines seem to converge at a point in the distance).

The name comes from their frequent occurrences during twilight hours (those around dawn and dusk), when the contrasts between light and dark are the most obvious. Crepuscular comes from the Latin word "crepusculum", meaning twilight.

The rays in some cases may extend across the sky and appear to converge at the antisolar point, the point on the sky sphere directly opposite the sun. In this case they are called anticrepuscular or antisolar rays. These are not as easily spotted as crepuscular rays. This apparent dual convergence (to both the solar and antisolar points) is again a perspective effect analogous to railway tracks appearing to converge to opposite points in opposite directions. Crepuscular rays are usually orange in appearance because the path through the atmosphere at sunrise and sunset passes through up to 40 times as much air as rays from a high midday sun. Particles in the air scatter short wavelength light (blue and green) through Rayleigh scattering much more strongly than longer wavelength yellow and red light. Rayleigh scattering, named after the British physicist **Lord Rayleigh (John William Strutt)**, is the elastic scattering of light by particles much smaller than the wavelength of the radiation. The Rayleigh scattering does not change the state of material hence it is a parametric process. The oscillating electric field of a light wave acts on the charges within a particle, causing them to move at the same frequency and become a radiating dipole whose radiation we see as scattered light. This is the reason for the blue colour of the sky and the yellow tone of the sun itself. AK



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