

Photo puzzle about the Sun's size

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Abstract

The apparent size of a self-luminous body in its photograph is the size of the glow halo, which for light sources such as the Sun can exceed the size of the body itself by 3-4 orders of magnitude.

Text

An impressive photograph of the Earth-Moon pair from a distance of 64 million km, taken by the OSIRIS-REx spacecraft, appeared on the NASA website on February 14, 2018 (Fig. 1).

<https://www.nasa.gov/image-feature/goddard/2018/osiris-rex-captures-new-earth-moon-image>



Fig. 1. Photo of glow halos of the Earth-Moon pair.

Almost simultaneously with this photograph, a photograph of the halo of the glow of the strontium atom, known as the "glow of one atom", appeared (Fig. 2).

More precisely, it is a strontium ion in an atomic plasma similar to the sun.

<https://www.sciencealert.com/photo-of-a-single-trapped-atom-wins-uk-science-photo-prize>

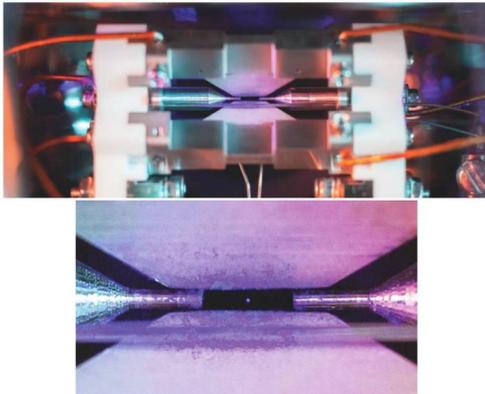


Fig. 2. Photo of a halo of glow of a strontium atom.

For the Earth-Moon pair, the ratio of the diameters of the halos in pixels in the photograph and the ratio of the diameters of their bodies from Wikipedia are the same and equal to 3.7, that is, the halo is about 27 times larger than the object.

For the strontium atom in the photograph, the same estimate shows that the halo is about 4-5 orders of magnitude larger than the atom from Wikipedia. If the photo is not fake, then interesting conclusions follow from it.

The strontium atom and the sun are plasma light sources of the same type. Therefore, an energetic similarity of their glow halos can be assumed. Then the diameter of the solar glow halo will be 4-5 orders of magnitude larger than the diameter of the Sun's body. The diameter of the solar glow halo is calculated according to the Stefan-Boltzmann law and coincides with the "apparent" size of the Sun from Wikipedia.