Re: How many photons in one airy disc?

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- *From*: Chris L Peterson <clp@xxxxxxxxxxxxxxxxx>
- *Date*: Mon, 30 Jan 2006 05:43:43 GMT

On 29 Jan 2006 18:24:23 −0800, "jayz" <jaydurianz@xxxxxxxxx> wrote:

>Maybe it's this.
>
>The photons in one light ray has the same angle. They converge
>into a cone ending as airy disc. So an airy disc has all the photons
>in the parallel rays converging into it. Disagree? It has to do with
>angle. Now in a second ray of light, the photons path has another
>angle This is why the airy disc of two light ray can be beside
>each other.

You'd do best not thinking of this in terms of rays. Rays are a useful fiction for analyzing optics geometrically, but when you are talking about Airy disks, diffraction is involved, and geometric optics is no longer the model to use.

A star essentially represents a point source to an optical system. It is sending out photons in all directions, and the telescope intercepts some very small fraction. The number intercepted depends on the aperture of the scope (and the brightness of the star). Because the star is equivalent to a point source at infinity, all the photons from it that enter the telescope are traveling parallel to each other− but none are following exactly the same path. The optics bring nearly all of these photons to focus in a small area. The exact profile of that area is determined by diffraction− something that occurs because the aperture is of finite diameter.

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- ***References***:
  - ***Re: How many photons in one airy disc?***
    - *From:* Chris L Peterson

- ***Re: How many photons in one airy disc?***
  - *From:* jayz

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