

Re: How does projection magnification in astrophotos change the Airy disk size?

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Source: <http://sci.tech-archive.net/Archive/sci.astro.amateur/2005-04/msg02507.html>

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 - *Date:* 25 Apr 2005 20:44:22 -0700
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Chris L Peterson wrote:

>Would you care to explain to the uninitiated what is it that makes the

>PSF "approximately Gaussian" in astronomical imaging?

Sure. In a perfect system, with no tracking errors or seeing effects, you would have a PSF described by a Bessel function. Now if you take that and convolve it with the tracking error, which ideally shows a normal distribution from the center, and with the seeing, which also follows a normal distribution, you end up with the resulting function closely approximating a Gaussian.

Not clear what is "normal" (or abnormal?) distribution. Aside the more or less typical formalistic description, the PSF in imaging usually can be approximated by Gaussian functions due to disappearance of ring structure (Gaussian functions do not form successive minimas and maximas, and purely approximate the bright rings structure).

"The PSF merely describes intensity distribution of a point source"?
What do you think resolution is?

Limiting "resolution" to that of a pair of point objects images, for the sake of simplicity (very much needed here, indeed), resolution can be described as producing an image with such a pair fully or partially resolved. Therefore, it is not directly determined by the PSF, rather by the property of the detector (will neglect other imaging factors, for the sake of simplicity), which ultimately determines actual size(s) of the recorded images.

The FWHM is nearly constant over an image. It certainly does not vary with a star's brightness or color.

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The FWHM is determined by the PSF, which is in turn directly dependant on the wavelength in its limiting (diffraction) form.

On the other hand, seeing error effects shorter wavelength more (in proportion to $\lambda^{1.2}$), so that t