

Re: Practically achievable beam divergence for white, non-coherent light

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From: Ian Stirling (root_at_mauve.demon.co.uk)

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Joe D. <joe@nospam.invalid> wrote:

> *"Ian Stirling" <root@mauve.demon.co.uk> wrote in message*
> *news:4220f3fc\$0\$77057\$ed2619ec@ptn-nntp-reader01.plus.net...*
>> *There is nothing magic about a Cassegrain (or any other system).*
>> *You end up focussing one point on the light source to one angle of output*
>> *from the main mirror/optic.*

>
> *In the Archimedes "burning mirror" myth, he focused light on ships*
> *hundreds of meters away.*

>
The key word is 'myth'.

<snip>

> *Given a 3 meter parabolic primary, a 0.5 meter final beam diameter*
> *that diverged over 500 meters to 1.0 meter beam diameter, that*
> *would produce sufficient flux to ignite wood in less than 30 seconds*
> *(about 40kw / m²).*

The fundamental limit is that you can't make an image of the sun that's brighter than the sun.

If this was true, then you could run a heat engine between the sun, and its image, and this is impossible.

In practice, 40Kw/m² needs an image of the sun that's (about) 40 times its normal visible area at the target.

Let's say your target is 200m out.

The image off a flat mirror at 200m is (about) 2m.

So, we need 40 2m mirrors, or 160 1m diameter mirrors.

In theory, you could do this with 4*40 men on a framework, all aiming their own mirror.

> *However the required beam divergence would be 0.06 degrees (!!)*

>

> *Can any mirror-based optic system TODAY produce a 0.06 degree*
> *beam divergence using sunlight? What would the optic design be?*

Yes, as I answered earlier.