Re: Looking for an Example of Interferometry to Illustrate Increased Resolution

Source: http://sci.tech−archive.net/Archive/sci.optics/2008−01/msg00168.html

- *From*: "W. Watson" <wolf_tracks@xxxxxxxxxxx>

- *Date*: Wed, 30 Jan 2008 16:05:21 GMT

It might work, but I often deal with people for which some really simple set up or example would be more appropriate. Pretty much I would like something that makes the idea plausible to lay people.

Incidentally, who came up with the idea of using two mirrors separated by some distance to improve the resolution of the image?

Helpful person wrote:

> On Jan 29, 4:36 pm, Phil Hobbs <p...@xxxxxxxxxxxxxxxxxxxxxxxxxxxxx> wrote:
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> > W. Watson wrote:
> >
> > > I'd be satisfied with with monochromatic sources. The only way I've ever
> > > been able to illustrate the concept, or get across the idea in some way,
> > > the is to take to either cover the aperture of say a Newtonian with a
> > > mask, or cover the surface of the mirror with a mask and show that
> > > individual areas are collectively capable of seeing a star. I may be
> > > fooling myself. In some way it shows that the ability of mirrors
> > > separated can be combined to produce a good quality image. So in a
> > > sense, the concept is "buyable".
> >
> > That's the spatial filtering idea, done at the pupil−−and it sounds like
> > a good idea. However, a single interference term won't form an image in
> > laser light either. I don't have a good Fourier optics demo right
> > handy, but your idea of putting masks on a telescope aperture is a
> > possibility−−maybe you could use strips of coloured tape that you could
> > take off and put back. That's not a strictly fair demo, of course,
> > since N source regions will produce N(N−1)/2 spatial frequencies, but
> > something like that would get the point across.

Cheers,

Phil Hobbs

A possible demo might be Young's douuble slit experiment. This has two apertures which basically select a single frequency from a delta function (the source). Change the distance between the slits and you can see the different frequencies.

It should be possible to extend this to a real object, with the slits acting as a filter to pass a single frequency. position the slits at the lens aperture and use various sinusoidal objects. Not necessarily easy to design, but should work.

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