Re: diffraction curiosity questions

Source: http://sci.tech−archive.net/Archive/sci.optics/2008−03/msg00081.html

- *From*: Salmon Egg <SalmonEgg@xxxxxxxxxxxxx>
- *Date*: Tue, 18 Mar 2008 10:18:49 −0700

In article
<81645c03−81c9−4b93−8680−c2c821f1fdbd@xxxxxxxxxxxxxxxxxxxxxxxxxxxxx>,
Brian <brian4052003@xxxxxxxxxxx> wrote:

> Of course it isn't only in optical resonators that this is true. What
> most optical designers like me find extraordinary is that for an
> optical system which is "useful" (in other words, not too badly
> aberrated), the aberrations and hence the diffraction performance, can
> be estimated through ray tracing. In other words, starting with the
> assumption that light only travels in straight lines, you can come up
> with a very good approximation to the distribution of intensity in the
> diffraction pattern in the image plane, which is based on the fact
> that it doesn't! And because it is the image plane that you are most
> interested in most of the time, the fact that these approximations
> fall apart in the intervening spaces is irrelevant. What is
> particularly stunning about this is that it made the design of
> excellent lenses possible long before we had today's computing power.
> The earliest calculations of diffraction patterns were carried out
> when rays were traced using 7−figure tables.

Can you be confusing aberration with diffraction? Almost all lens design
is based upon geometric optics. The wave nature of light is unimportant.
The pathlength differences from aberrations are usually much greater
than those involving diffraction. Nevertheless, the diffraction integral
will show the effects of diffraction and aberration.

Bill
.