

Re: Fabry-Perot question

Source: <http://sci.tech-archive.net/Archive/sci.optics/2004-12/0161.html>

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Date: 12/01/04

Date: 01 Dec 2004 11:01:55 -0500

Níkola Heímpel <niki0904@nurfuerspam.de> writes:

- > *If I have a spherical mirror Fabry Perot interferometer and do get*
- > *some signals, but they are way too small, what reason could that have?*

- > *We do see signals, FSR as expected, fairly easy. They are already*
- > *quite narrow (Finesse around 20) and we see two modes of our HeNe*
- > *Laser. Just the transmitted intensity is very small, only about 1/1000*
- > *of the initial intensity, and I don't understand why.*

Are you doing a confocal or true spherical cavity? What is the radius of curvature and reflectance of the mirrors?

- > *What would be the most likely reason:*

- > *- insufficient mirror surface quality, destroying the wavefront after*
- > *some cycles?*

Yes. However, this isn't as critical as for laser resonator mirrors in the sense that a speck of dust will affect it greatly.

- > *- misalignment (hard to believe, since we have sensitive alignment*
- > *mechanics and tried for a very long time - also always get the same*
- > *values, even after taking everything apart and trying again, and the*
- > *maximum intensity we get is also very sensitive to adjustment changes)*

No, assuming a reasonable design, alignment is not that hard. You should be able to do it mostly by just observing the scatter of the beam on the mirror surfaces if they are accessible.

However, you may be setting the cavity at the wrong distance for a mode degenerate interferometer and getting confused thinking you have it set correctly. The output could be much lower in that case by an order of magnitude or more.

How are you setting the distance?

> – *something completely different?*

- > *We use self-coated mirrors, so mirror quality could well be an*
- > *issue. But why are the peaks narrow then? I expected to get either*
- > *small and broad peaks, or huge and narrow ones. To me it looks like*
- > *I'm "losing" intensity somewhere.*

Have you tested the mirrors?

Don't expect textbook performance. I can easily get about 10 percent through for the peaks using HeNe laser mirrors. But 1/1000th is quite low.

More info in the Laser FAQ at:

<http://repairfaq.ece.drexel.edu/sam/laserlia.htm#liasfpi>

— sam | Sci.Electronics.Repair FAQ Mirror: <http://repairfaq.ece.drexel.edu/Repair> | Main Table of Contents: <http://repairfaq.ece.drexel.edu/REPAIR/> +Lasers | Sam's Laser FAQ: <http://repairfaq.ece.drexel.edu/sam/lasersam.htm> | Mirror Sites: http://repairfaq.ece.drexel.edu/REPAIR/F_mirror.html

Note: These links are hopefully temporary until we can sort out the excessive traffic on Repairfaq.org.

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