

Re: The sound of a laser.

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From: Randy Poe (*poespam-trap_at_yahoo.com*)

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"David Prokopetz" <sirbob@penguinking.com> wrote in message news:<2ol510Fbmdq4U1@uni-berlin.de>...

> *Hi.*

>

> *Physics newbie question here: what does a laser sound like? Some sources*

> *I've read claim that a sufficiently powerful laser would ionise the air*

> *along its path and produce a "crackle" or "pop" noise,*

Biggest laser I ever worked with was 2 W, so I have no first hand knowledge. What you're talking about is usually associated with high voltages, such as a lightning bolt, an electric discharge, or the corona around a high-voltage line. That wouldn't be a mechanism for a laser to ionize air.

However, if it made the air hot, that *would* be a mechanism for this sort of thing. So the question is, under what circumstances would laser heat the air along its path?

You can see a powerful laser beam from the side because of scattering off dust in the air. I could imagine a powerful enough laser heating the dust enough to boil it. Hence, a crackling sound.

> *while others claim*

> *that regardless of power, a laser has to be of a particular colour to ionise*

> *the air and thus produce a sound*

Not true. However, dust and air molecules, like everything else, absorb different wavelengths differently. Black dust absorbs most visible wavelengths, so it would get hotter. Air is transparent in the visible, but not 100% transparent. so the air along the path is going to get microscopically hotter.

However, obviously you'll put more energy into the air, making it hotter, if you choose a wavelength where it absorbs. There are probably some good choices in the infrared.

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I don't have anything like an absorption spectrum for nitrogen handy, but that would tell you which wavelengths are preferentially absorbed.

– Randy