

MITOCW | Laser fundamentals III: Multi-wavelength argon laser | MIT Video Demonstrations in Lasers and Optics

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SHAOUL

In this next demonstration, we're going to look at the spectrum of the light from an argon laser. We know that an argon laser lases in several wavelengths simultaneously. So, what we're going to do, we're going to take the light from the argon laser, and we're going to look at it using a simple grating to see if, indeed, there are several wavelengths that are oscillating simultaneously.

EZEKIEL:

Now we've turned the discharge tube on, and the laser is lasing. The output of the lasers coming out from this end were reflected by this mirror mount and this mirror over here. And let me show you. Let me show you then the laser beam. Here's the laser beam coming out from the argon laser. What we're going to do is reflect it again by another mirror over here onto this screen.

Now the argon laser lases at several wavelengths at the same time. So, in order to demonstrate this, I'm going to take this grating here, and I'm going to put it in the way of the beam, and it will disperse the various colors. Now what you see on the screen right now are the various orders of the grating, but it's difficult to see the various colors from this angle.

So, what we'll do, we'll take a close look at the various orders and see how many lines are lasing. So let me again repeat this again here. With the grating out, we only have one spot on the screen. Then, when the grating is in, we see the various orders.

So now we'll zoom in and look at these various orders. So here we have a close up of the output of the grating and see the various orders. Here's the zero order on the grating. Here's the first order.

Now, in the second, we are already beginning to see the dispersion, see several colors. And I think, in the third order, you're already beginning to see, between the third and the fourth, that there are indeed several laser lines that are lasing. So,

If we can then zoom in on these orders-- in this case, this is the fourth-- we can see that we have blue, light blue, and another weaker one in between and then the green, which is at 5,145 angstroms. So, indeed, the laser is lasing at least at three to four lines simultaneously.