

MITOCW | Laser fundamentals III: High power argon laser | MIT Video Demonstrations in Lasers and Optics

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PROFESSOR: We're now going to look at another laser, the argon laser. It's much more powerful than a helium-neon laser. In fact, it can put out several watts and even several tens of watts, principally, in the blue, in the green, and also in the ultraviolet. In this first demonstration, we're going to take the output of this argon laser here, and, without focusing it, we're going to send it onto a piece of cardboard. And we want to show you what happens.

Now, here you see the argon laser. It puts out about 2 watts or so in the blue and green. The blue is around 4880 angstroms, the green is around 5145, and other weaker wavelengths, both in the visible and also in the ultraviolet. You can't see very much of the laser, so what we're going to do is take the top off so you can get a closer look at what's inside this laser.

Here is the argon laser without the top on. It certainly looks very complicated. But I'll try and help you along by identifying some of the important features in the laser. And we'll do this in close-up.

So first, let's zoom in to the left side of the laser, where we see the mirror mount that holds one of the laser mirrors. So the mirror is held down there. And then the air path between the mirror and the discharge tube is sealed with bellows over here. And here is, then, the beginning of the discharge tube.

Here you see the cathode-- the big cathode-- for this laser. The bore of the tube is inside this magnet. So you can't see it. And then there is this magnet here that provides a longitudinal magnetic field. So here is the magnet. And then the anode is located over here.

Now, because this is a powerful arc discharge, both the bore and the magnet are water-cooled. Over here, you see that the discharge tube is terminated with a window at Brewster's angle. And, finally, the second mirror is mounted in this hole over here.

Now, we're going to turn the power on and look at the output. Now, the argon laser puts out a lot of power, as I said, around 1 or 2 watts from this laser. And one thing you don't want to do is get in the way of the beam. Now, here, we see a piece of cardboard that's unlucky enough to be in the way of even an unfocused beam.

So if we turn up the power in the argon laser, you see what happens. You see a nice hole burnt in and lots of smoke comes out. And this is, remember, the unfocused beam. We have about 1 watt of power.

And here is the hole we just burned in the piece of cardboard. Looks pretty bad. And, remember, this is the unfocused argon beam.