

IMPERIAL

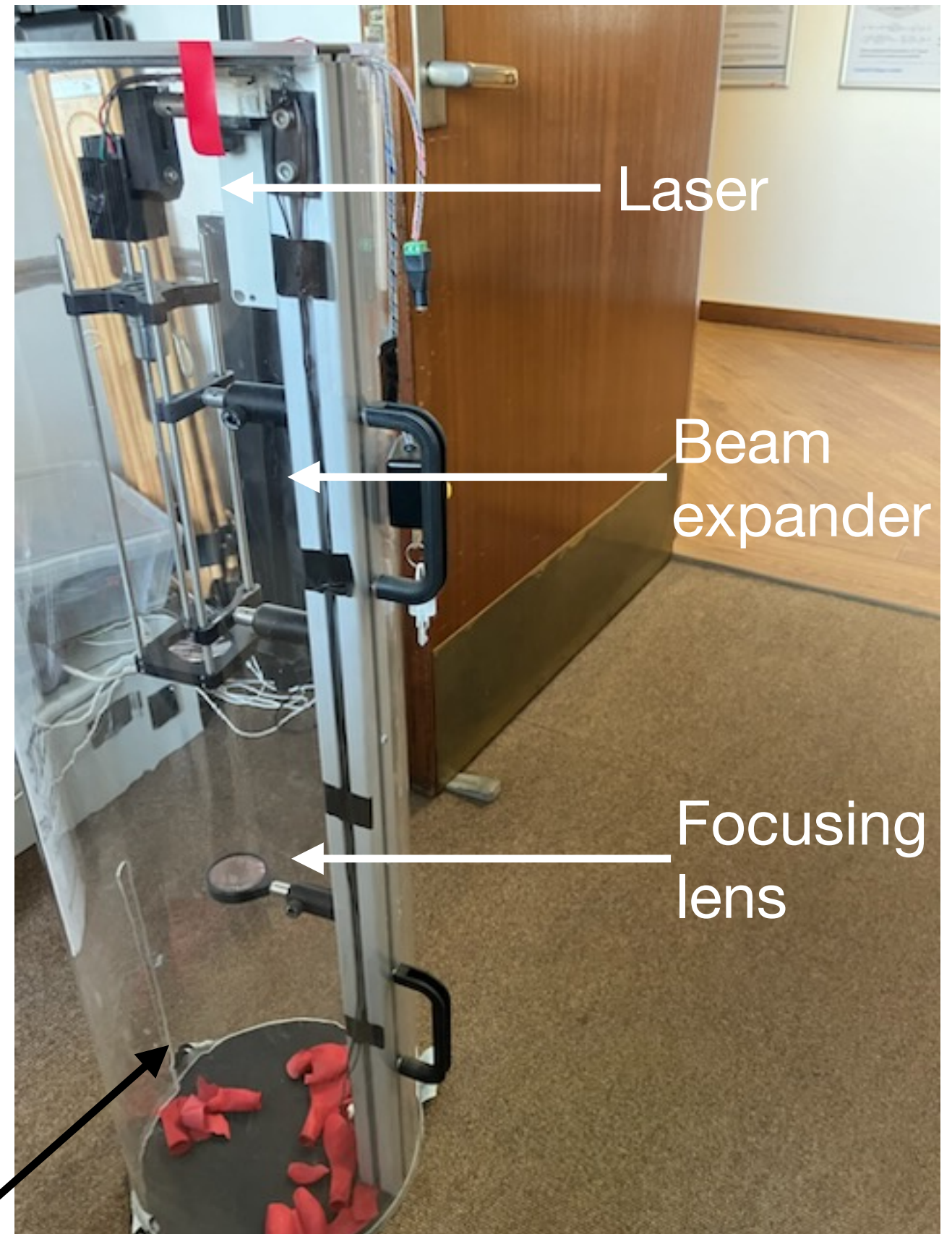
Popamatic demo

What is this activity?

The activity is to pop a balloon using a laser

1. Guest inserts an uninflated balloon into the slit
2. Inflate the balloon using an external pump (not shown)
3. Move the balloon up and down until the surface is at the laser focus
4. Pop!
5. Bonus: see if different colour balloons still pop

Balloon
goes here



How does this relate to LhARA

1. The LhARA beamline begins with a laser driven ion source
2. The laser driven ion source works by focusing a very powerful laser onto a small piece of matter
3. The ions generated are close to the speed of light (e.g. $0.1c$)
4. This is only possible because you can concentrate energy so efficiently with lasers - as we can see with this demo!
 - The laser used for LhARA is $>10^{12}$ times more powerful than the laser in this demo
 - the energy density at the focus of LhARA's laser is equivalent of taking all the power used worldwide and concentrating to a point smaller than a human hair

What do we want people to take away from the activity

- Lasers are great!
- You can use lasers to heat things up
- By focusing a laser, you can concentrate the energy easier, making things even hotter
- By using extremely powerful lasers, we can heat things up so much that we can generate lots of ions at high energies - perfect to put into our accelerator

Technical troubleshooting and safety details

- It is loud - you may want to warn or ask guests if this is ok
- Residue from the balloons can settle on the lenses, stopping balloons from popping. These can be cleaned using a non-particulate tissue - some will be available
- If the device gets knocked, sometimes the alignment can drift. Normally you can re-align it just by knocking it again - the laser pattern should be circular on the lens
- Safety:
 - The laser is *not eye safe* so integrated safety systems must not be overridden/disabled
 - If there is severe misalignment, the whole system may need to be realigned. In this case, do not try to override safety systems to do it yourself - ask me and I will come and fix it