S'Cool LAB

WG1 & WG2

What is S’Cool LAB?

high school students

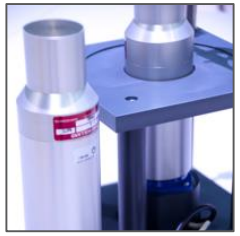
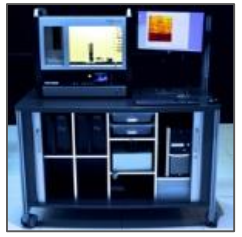
hands-on & minds-on particle physics experiments

Physics Education Research

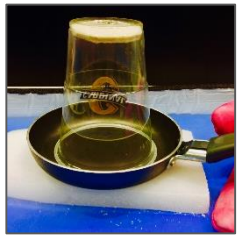
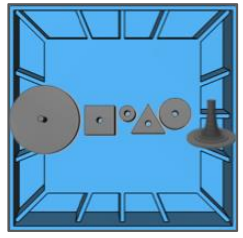
high school teachers

Experiments: high-tech vs. low-cost

In S'Cool LAB: high-tech

	electrons in magnetic fields		cloud chambers
super-conductivity		pixel detectors	
PET			X-ray machines

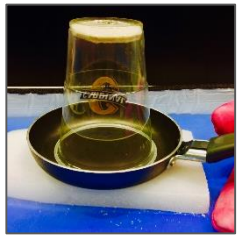
For the classroom: low-cost

3D printable magnet models		DIY cloud chambers	
	Bragg peak model		3D printable particle traps
3D compass			Rutherford scattering model

… and many more to come

Experiments: high-tech vs. low-cost

For the classroom: low-cost

3D printable magnet models		DIY cloud chambers	
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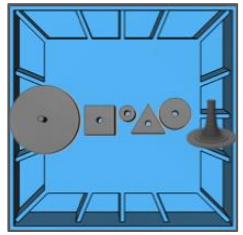
3D compass			Rutherford scattering model

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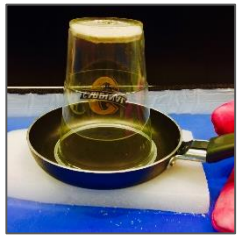
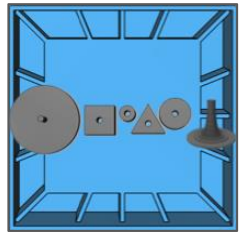
HST working Group – Low Cost 3D Printable Experiments

Fabian Bernstein and Lachlan McGinness

S'Cool LAB

3D printable magnet models		DIY cloud chambers	
	Bragg peak model		3D printable particle traps
Beam optics			Rutherford scattering model

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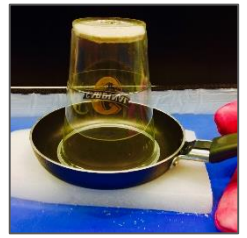
3D printable magnet models		DIY cloud chambers	
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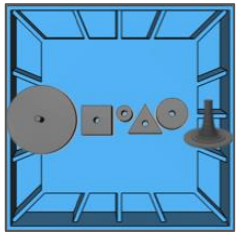
Beam optics			Rutherford scattering model

Quadrupole Ion Trap

HST working Group – Low Cost 3D Printable Experiments

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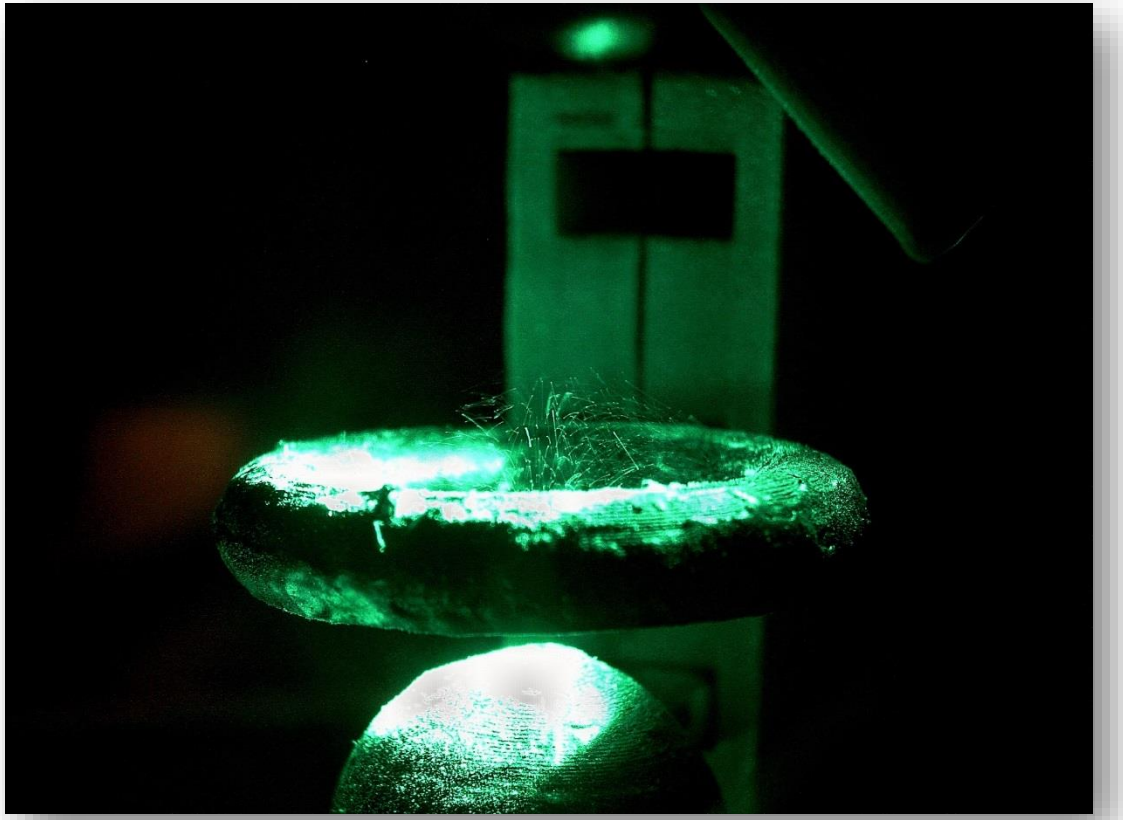

Quadrupole Ion Trap

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1.) Build a quadrupole ion trap

2.) Perform an experiment with the trap and figure out how it works

Quadrupole Ion Trap

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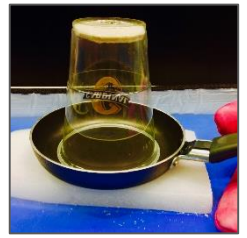
3D printable magnet models		DIY cloud chambers	
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Beam optics			Rutherford scattering model

Beam Optics

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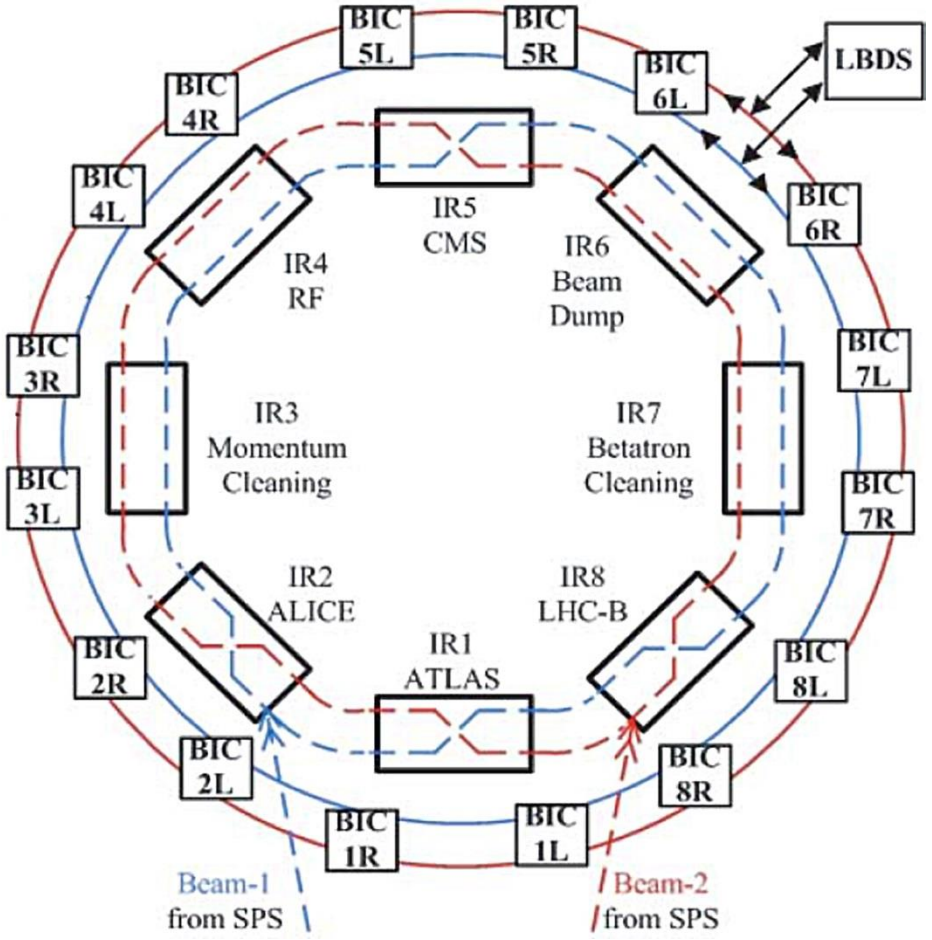
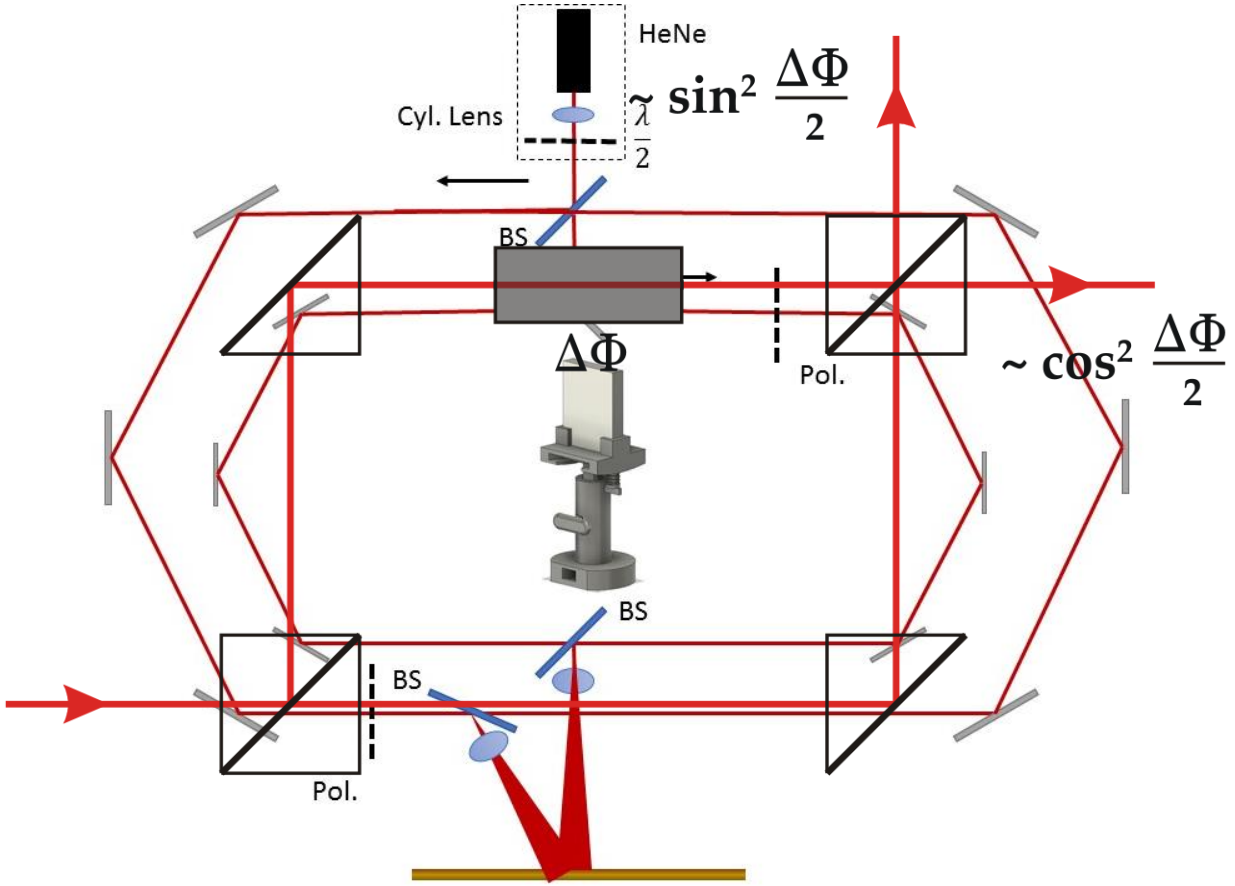




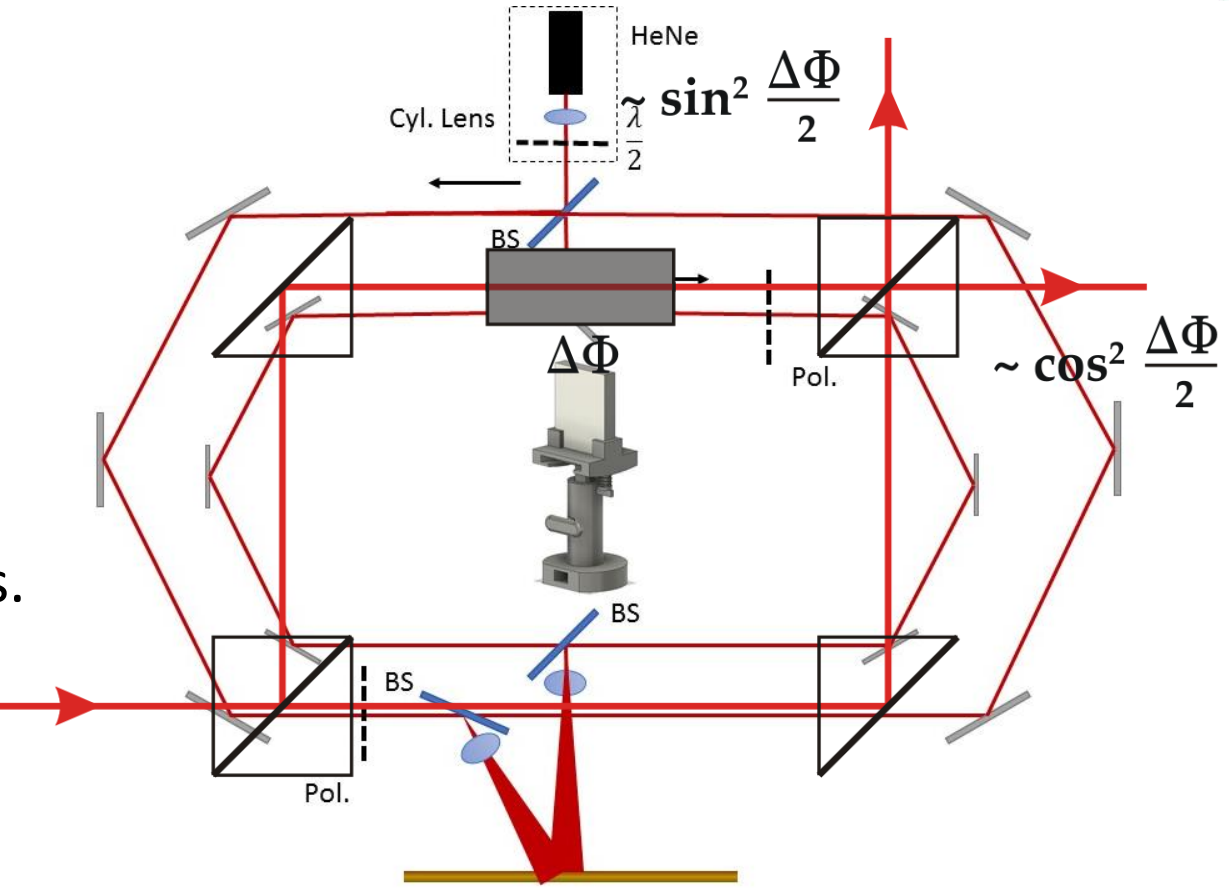
HST working Group – Low Cost 3D Printable Experiments

Fabian Bernstein and Lachlan McGinness

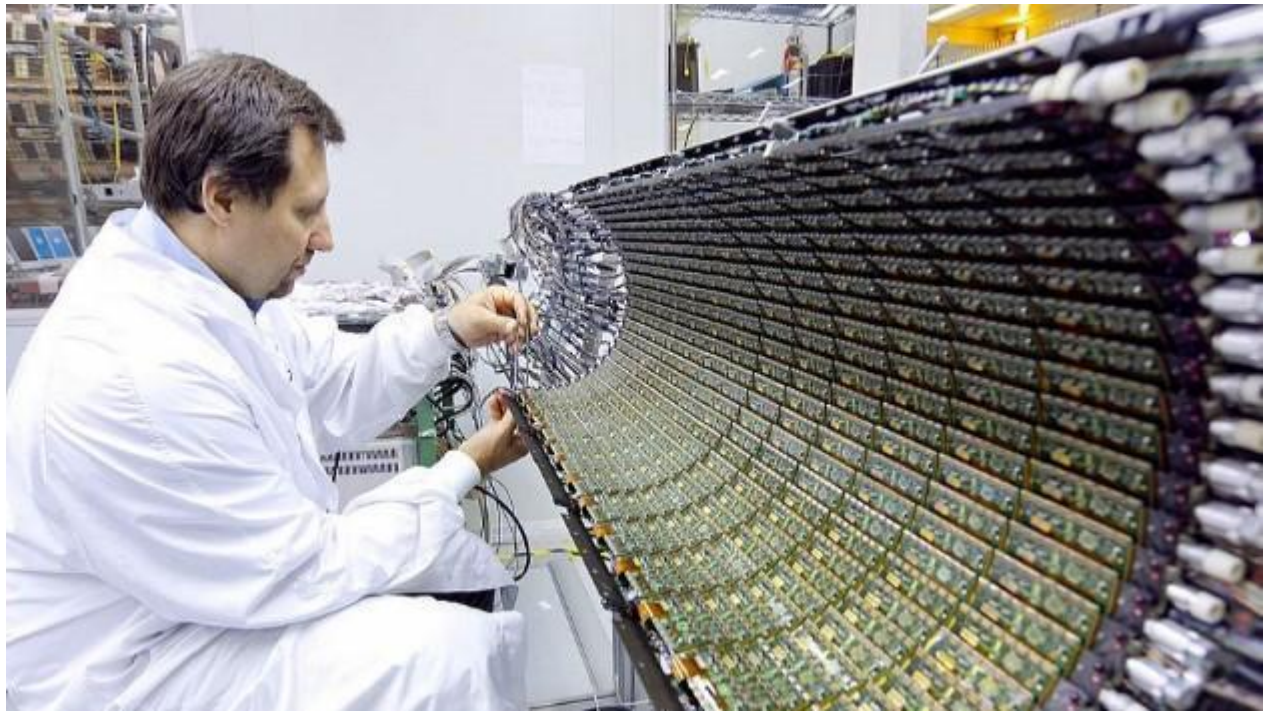
We are looking to represent the LHC proton beam using geometric optics.

Mirrors and lenses can bend and focus optical beams. In the LHC different types of magnets bend and focus particle beams.

This is a more open ended project and we are excited to see where you take it.



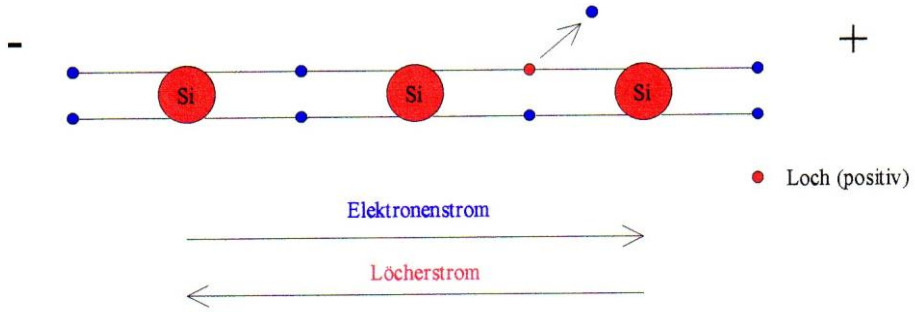
HST S`Cool LAB Working Group 2 Semiconductors at CERN

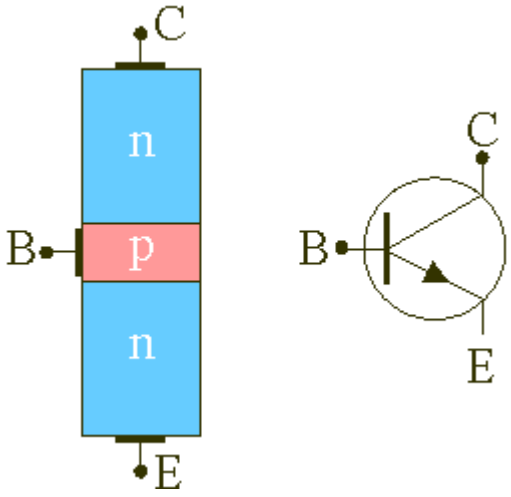


https://www.elektroniknet.de/markt-technik/halbleiter/ohne-halbleiter-kein-higgs-teilchen-105672.html

HST S`Cool LAB Working Group 2 Semiconductors at CERN

- Experience how Semiconductors can be introduced at school

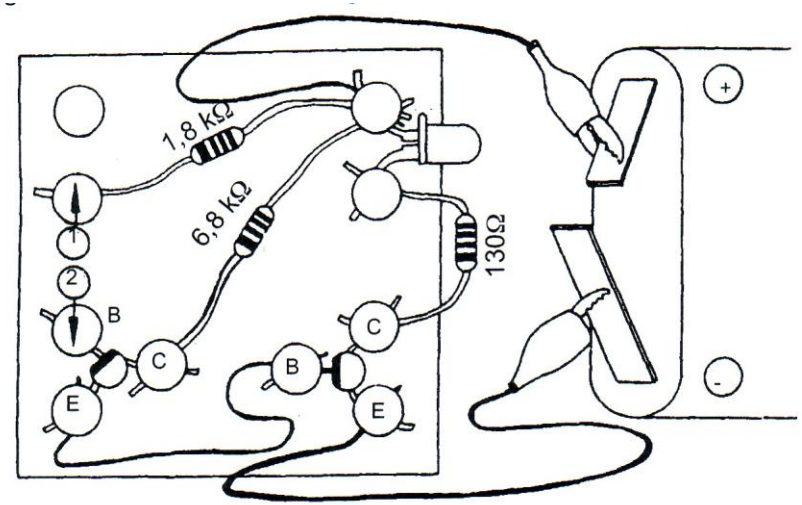


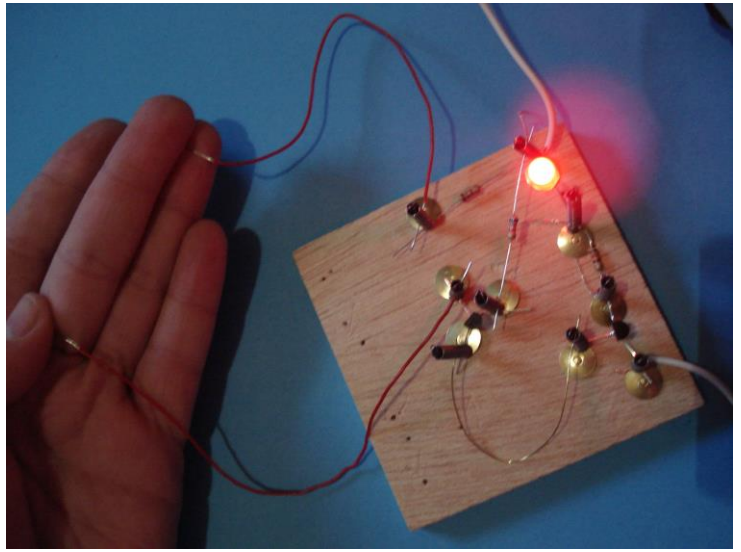


npn-transistor

HST S`Cool LAB Working Group 2
Semiconductors at CERN

- Experience how Semiconductors can be introduced at school
- Use hands-on low cost experiments to discover different functional circuits

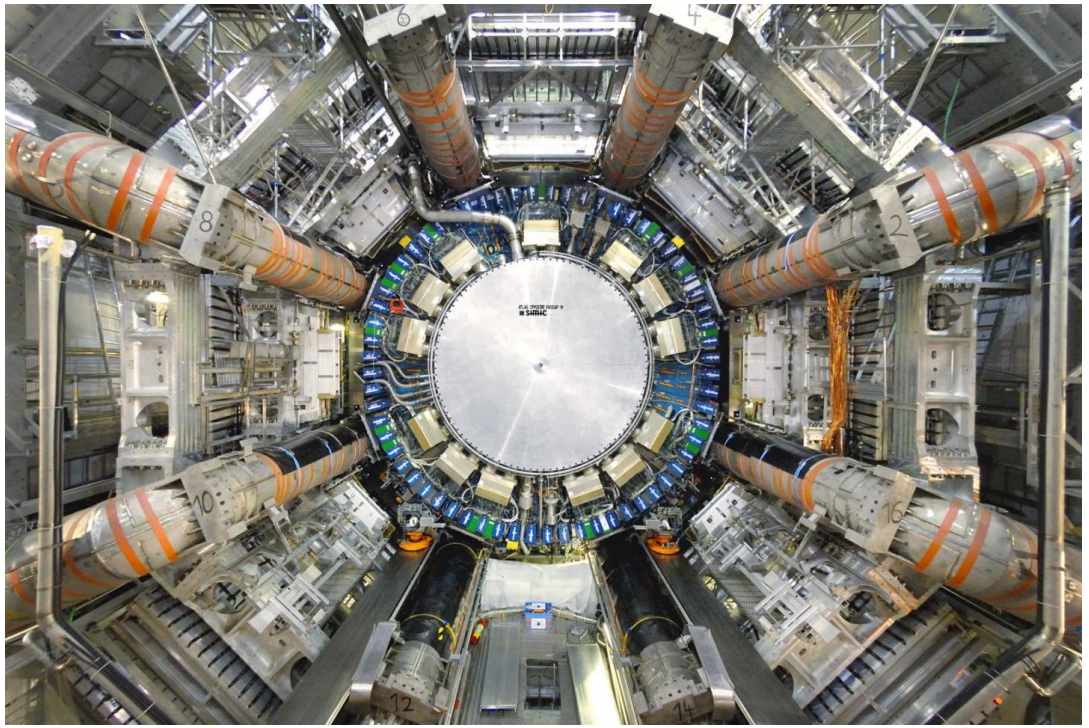




Sensor switch

HST S`Cool LAB Working Group 2 Semiconductors at CERN

- Experience how Semiconductors can be introduced at school
- Use hands-on low cost experiments to discover different functional circuits
- Discover where and how semiconductors are used at CERN



https://home.cern/sites/home.web.cern.ch/files/image/experiment/2013/01/atlas.jpeg

HST S`Cool LAB Working Group 2
Semiconductors at CERN

- Experience how Semiconductors can be introduced at school
- Use hands-on low cost experiments to discover different functional circuits
- Discover where and how semiconductors are used at CERN
- Create your own model for school, explaining the use of semiconductors at CERN