

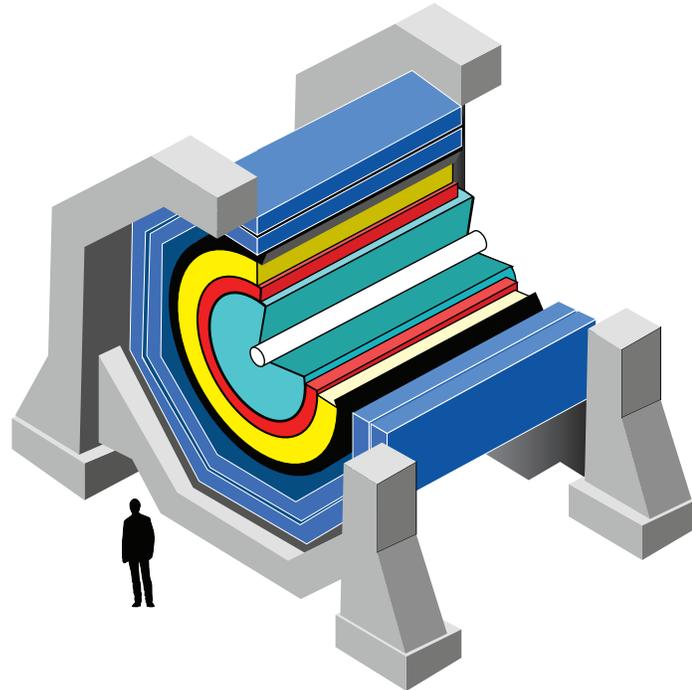


Activity Four: Tracking Unseen Particles

This experiment demonstrates how particle detectors work and why they are multi-layered, as shown in the cutaway and schematic illustrations on this page. Using a few simple materials you will be able to track the paths of magnetic marbles in the same manner that particle physicists track the movements of fundamental particles.

You will need these materials:

- Two shoe or shirt box lids, turned upside down
- Small objects to prop up the lids
- Magnetic marbles
- Ordinary marbles
- Fine iron filings



Follow these directions:

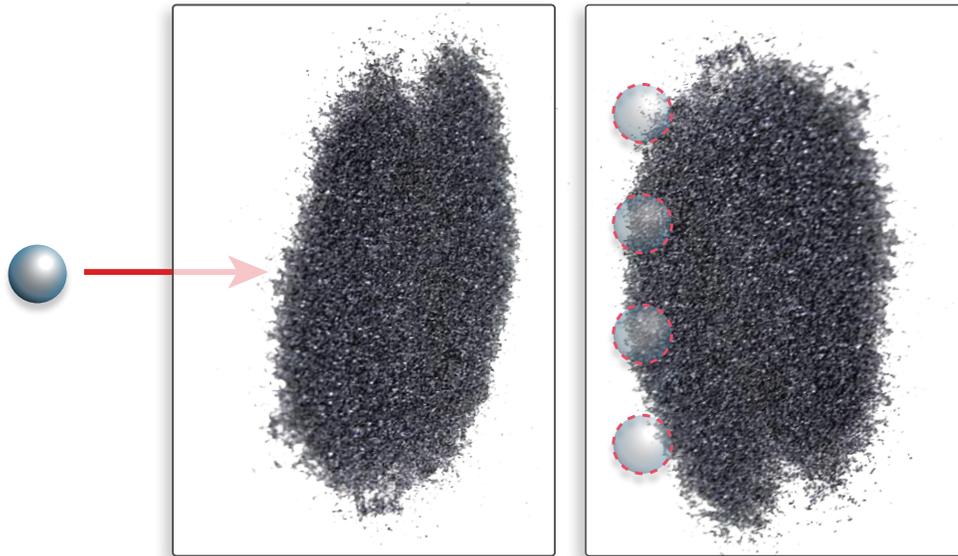
1. Place one lid upside down on the table and insert props at each corner to raise it just enough so that any of your marbles can roll under it.
2. Sprinkle iron filings in the lid so as to cover all of it. This is your simulated detector.
3. Roll a magnetic marble rapidly under this simulated detector. Write your observations here.

4. What property of the marble would you say your detector is recording?

5. Roll an ordinary marble under your detector. Record your observations here.

To which particle's behavior is this observation similar?

Now construct a two-part detector that can be used to track "neutral" or "uncharged" particles by making a line of four or more magnetic marbles immediately beyond the first lid, and placing a second lid over them (see diagram below). Your two-stage detector will be complete when you have sprinkled iron filings in the second lid.



6. a) Roll an ordinary marble under the first detector. If it hits a magnetic marble, what does the resulting trail in the second detector tell you?

6. b) To which particles is this behavior similar?

