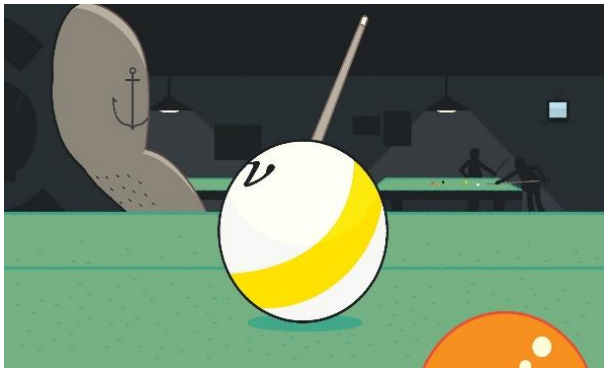
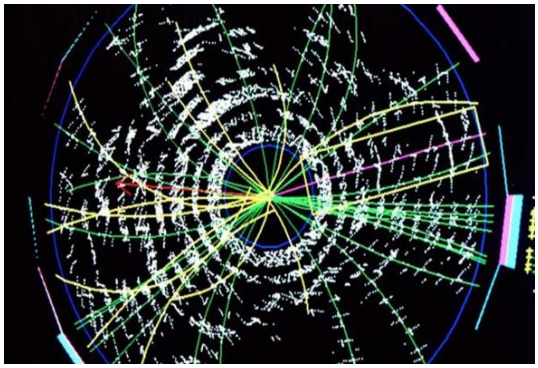
Can you play particle pinball?

Most collisions in our world, from billiard balls to neutrinos, can be described by one word—scattering—going in various random directions. Physicists explore the invisible subatomic world by creating particle collisions and studying their scattering patterns. They collect data, analyze millions of different particle interactions and gather information about the properties of particles.

This activity is to demonstrate how scattering works. It introduces students to the method of identifying target shapes by characteristic scattering patterns.





Materials: 6mm steel bearing balls (200), wood or plastic shapes (triangle, disk, square)

Activity: Select a target, position it on the center of the table and launch waves of BBs at the target in the center, one wave at a time. Repeat the experiment at least five times to identify the characteristic pattern.

Now, position another target and hide it; cover it with a flat disk. Launch waves of BBs at the target in the center, one wave at a time. Repeat the experiment at least five times. Try to identify the characteristic pattern and tell the shape of the target without seeing it.

Questions to ask:
What happens when pinballs hit the target?
Does the scatter pattern depend on the target shape?
Why do you need to take more data?
What scatter pattern is produced with a triangle? (Disk? Square?)

Useful links:
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https://twitter.com/Fermilab/status/1231972477741518848