

SPHERICAL PROPORTIONAL COUNTER (SPC)

WHAT IS HAPPENING ?

The sphere is filled with gas (neon).

When charged particles move through the gas, they bump into the gas atoms and free some electrons, leaving a **track** (*continuous line drawing the path of the particle*).

These **electrons** (*the small dots that are created*) drift toward the sensor at the center of the detector, because of the electric field created by the high voltage sensor.

Neutral particles do not leave a track in the detector but may **collide** with electrons/nuclei of atoms of gas which in turn leave a small track.

Drifting electrons induce **electrical pulses** upon reaching the sensor.

WHERE ARE THE PARTICLES COMING FROM ?

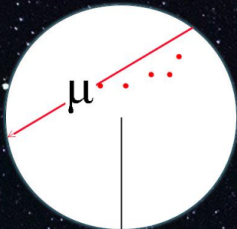
From far away: **muons**, created in the upper atmosphere by cosmic rays.

From the local environment: **gammas and betas (fast electrons)**, from the natural radioactivity of the materials all around you – including you !

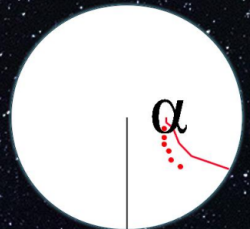
From inside the detector: **alphas** from radon gas inside the sphere.

Quiz : where are the **Dark Matter** particles coming

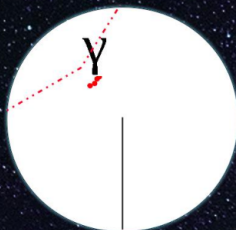
The different particles have distinctive behaviour in the detector and are identifiable by the shape of the induced electric pulses.



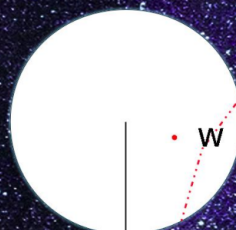
Muon + / -



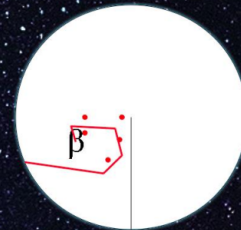
Alpha ++



Gamma ray
neutral



WIMP (Dark Matter)
neutral



Beta -
(electron)