



Phantom of the Universe 2D

KS3 – Post 16/Adult duration: 30 minutes Pre-recorded

This big-budget CERN production charts the quest for dark matter in an attempt to explain how the universe came into being. Particularly suitable for GCSE and A-level, this visually stunning film may also be inspiring for students at KS3. Narrated by Tilda Swinton.

Key Words:

Physics. Particles. CERN. Large Hadron Collider. Light. Dark matter. Higgs boson. Research. Atoms. Universe.

Content

Humans are dazzled and comforted by the sky at night – but astronomers now think something is hiding in the dark spaces that we can't see or touch – dark matter

Its gravitational pull is so huge that it affects the largest objects in the universe and even light itself

CERN (European Organization for Nuclear Research in Geneva) is home to more than 3000 scientists from 38 countries. Its largest particle collider, the Large Hadron Collider (LHC) is 17km in circumference

We enter this accelerator tunnel for the fastest chase on Earth, as protons are pushed to the speed of light through the beam pipe - eventually colliding with others

This is all part of the hunt for the fundamentals that explain dark matter

Scientists recently confirmed the existence of the Higg's boson in the Higg's field, and now are hunting for the invisible matter that makes up 80% of the mass of the cosmos

The structure and evolution of matter is explained, from the energy of the Big Bang to quarks, electrons, protons and atoms

After the Big Bang dark matter formed an invisible skeleton of strands in space, with the first galaxies growing at the intersections to become the universe we know today

Fritz Zwicky measured the mass of the Coma galaxy cluster in 1933 and was the first to infer the existence of unseen matter. According to his calculations the gravitational mass of the galaxies was 400 times greater than expected from their brightness alone, which means that most of the matter must be dark

In 1976 Vera Rubin investigated the rotation curves of spiral galaxies, showing that they were surrounded by dark matter 'haloes' that held them together

The Bullet Cluster cloud shows this – formed from the collision of two clusters of dark matter

Millions of dark matter particles pass through us every minute without us seeing or hearing them

A mile deep in a mine in South Dakota, a container filled with the element Xenon is waiting to collect evidence of dark matter particles, while researchers at CERN are trying to locate them amongst the debris of collisions

The LHC is the biggest and most complex machine in the world – a giant particle racetrack, accelerated by electric field and steered by magnets

Collisions of protons produce new, smaller particles – 40 million per second, carefully analysed by scientists worldwide for the shadow of elusive dark matter

Curriculum Links:

Please see Content Summary details for specific curriculum relevance

Potential Hazards and accessibility

There are no specific hazards associated with this show.