Dark Matter

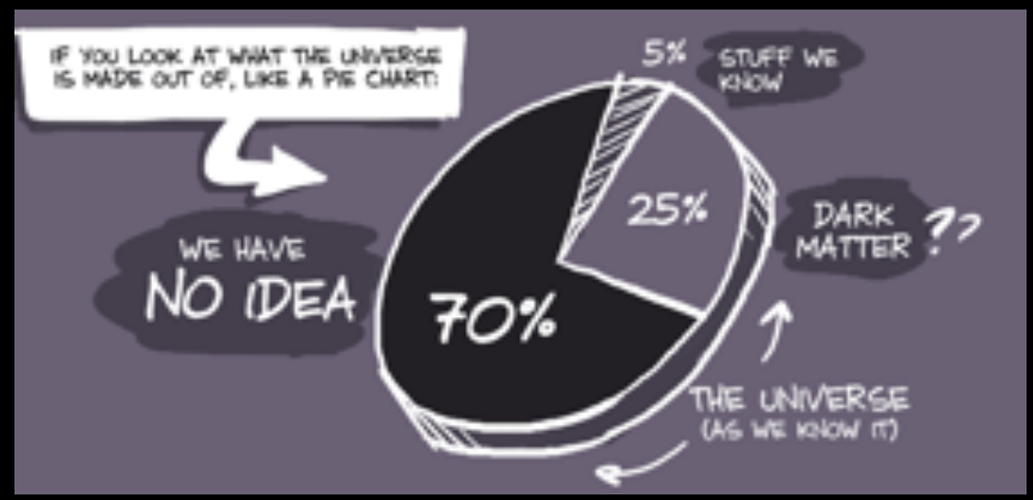
Group E

European School of High Energy Physics 2015

Bansko, Bulgaria

Introduction

- Observable matter makes up only 5% of the universe
- Dark matter makes up 25%
- Last 70% is “Dark Energy”
- How did we discover dark matter’s existence?
- How are we studying dark matter further?



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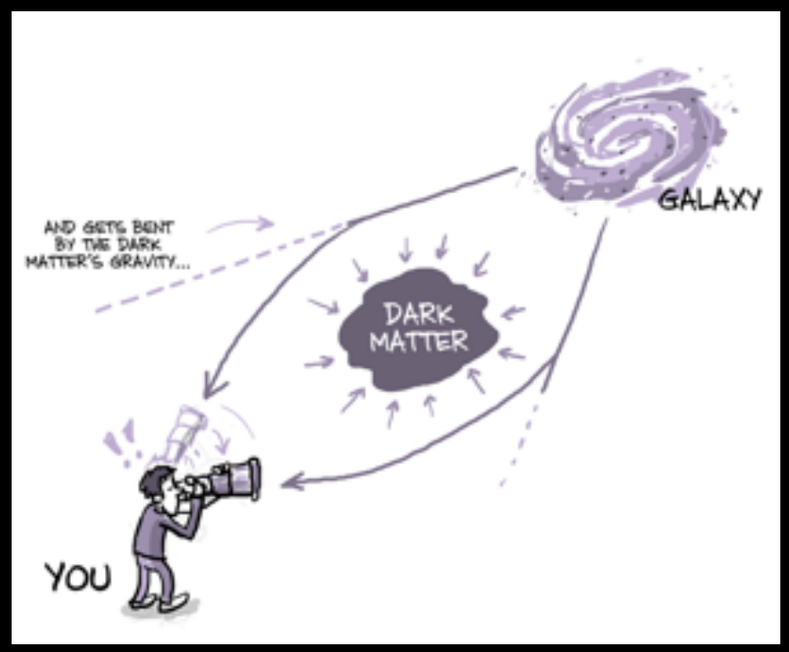

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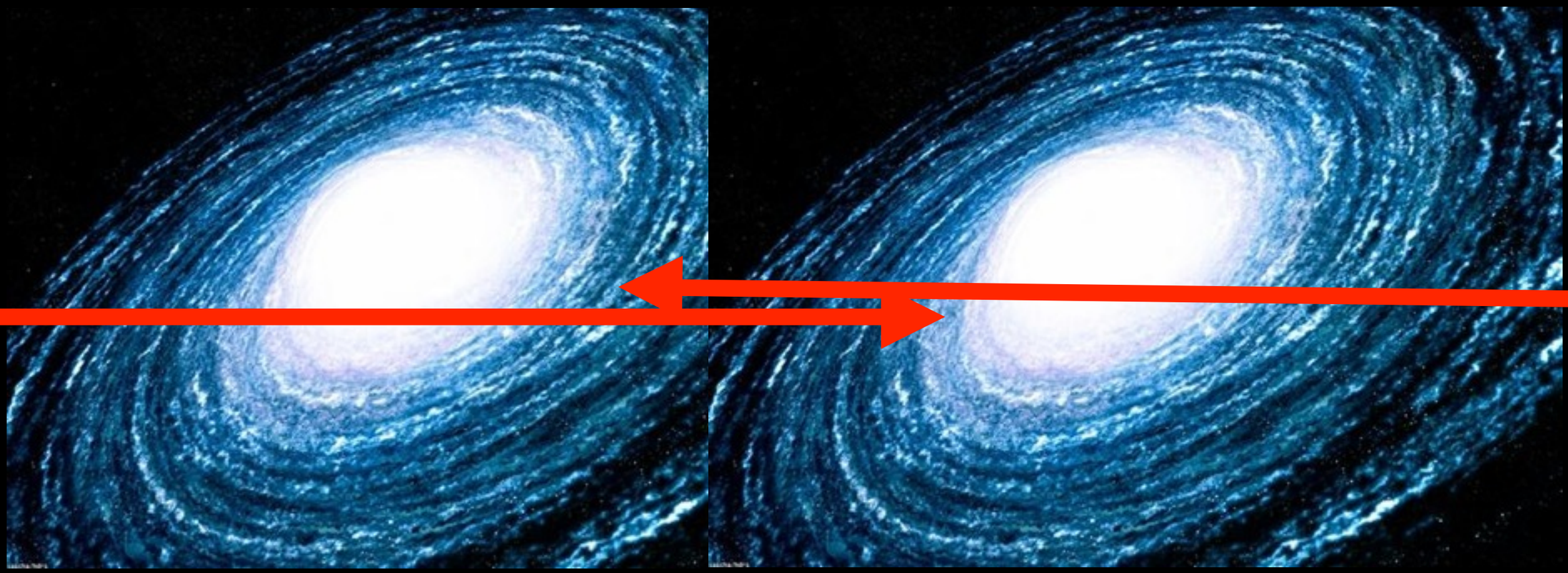

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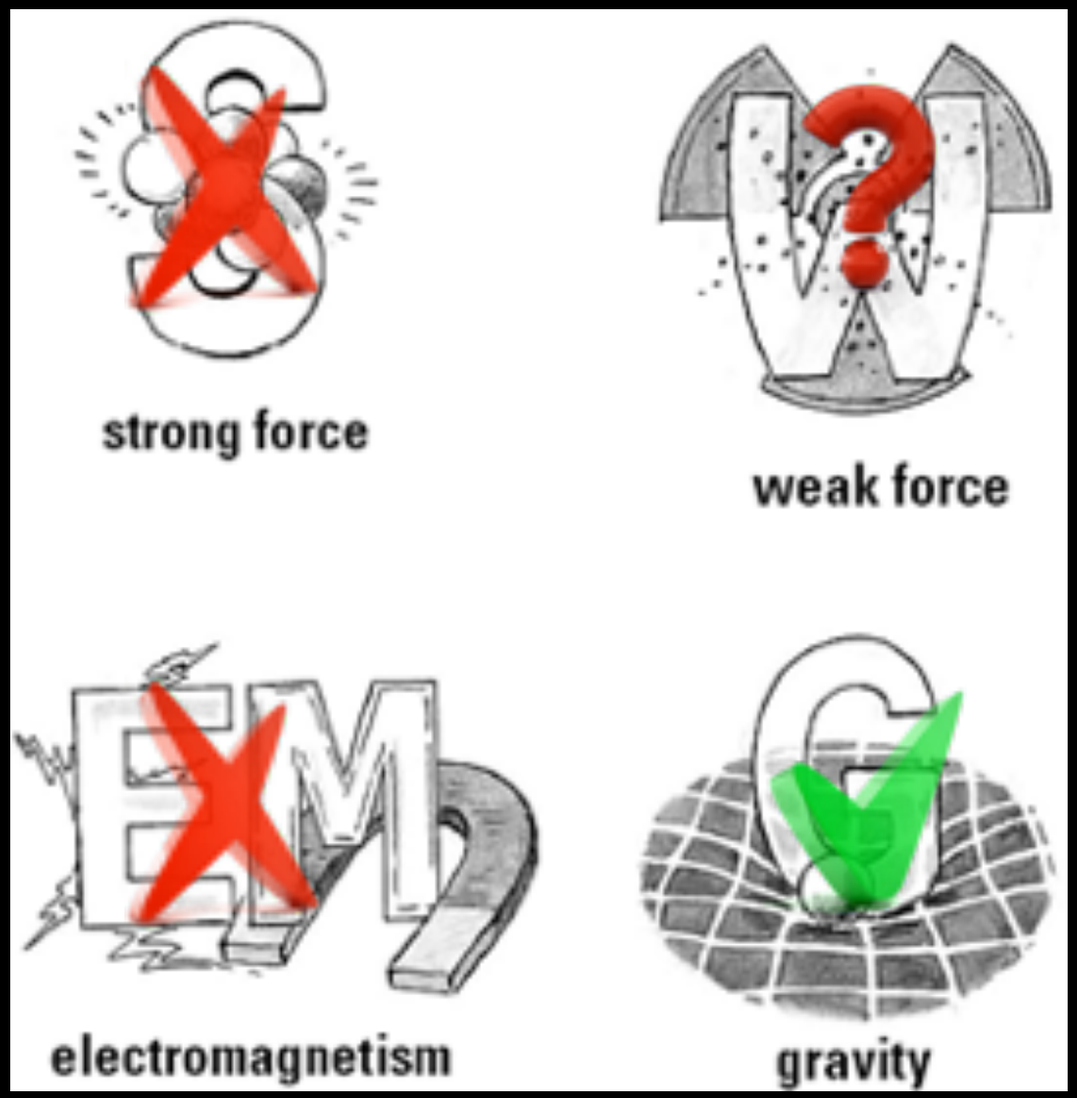
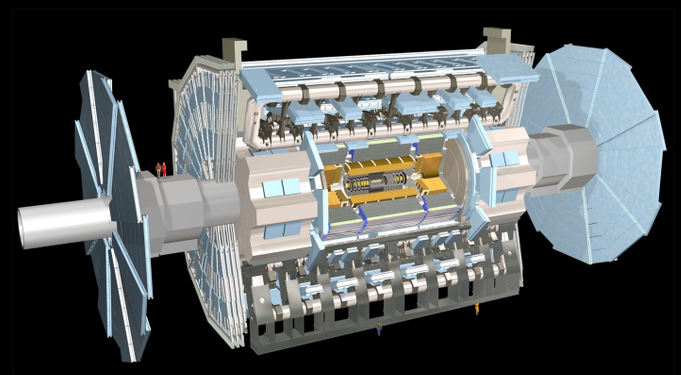
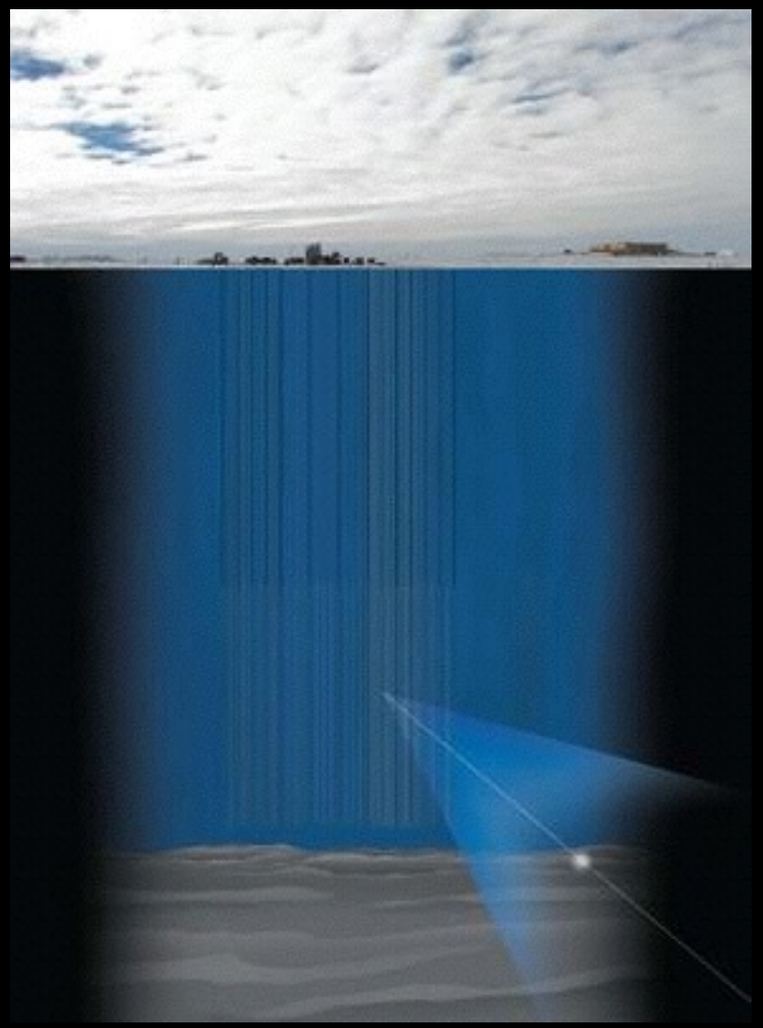
What do we know about Dark Matter?

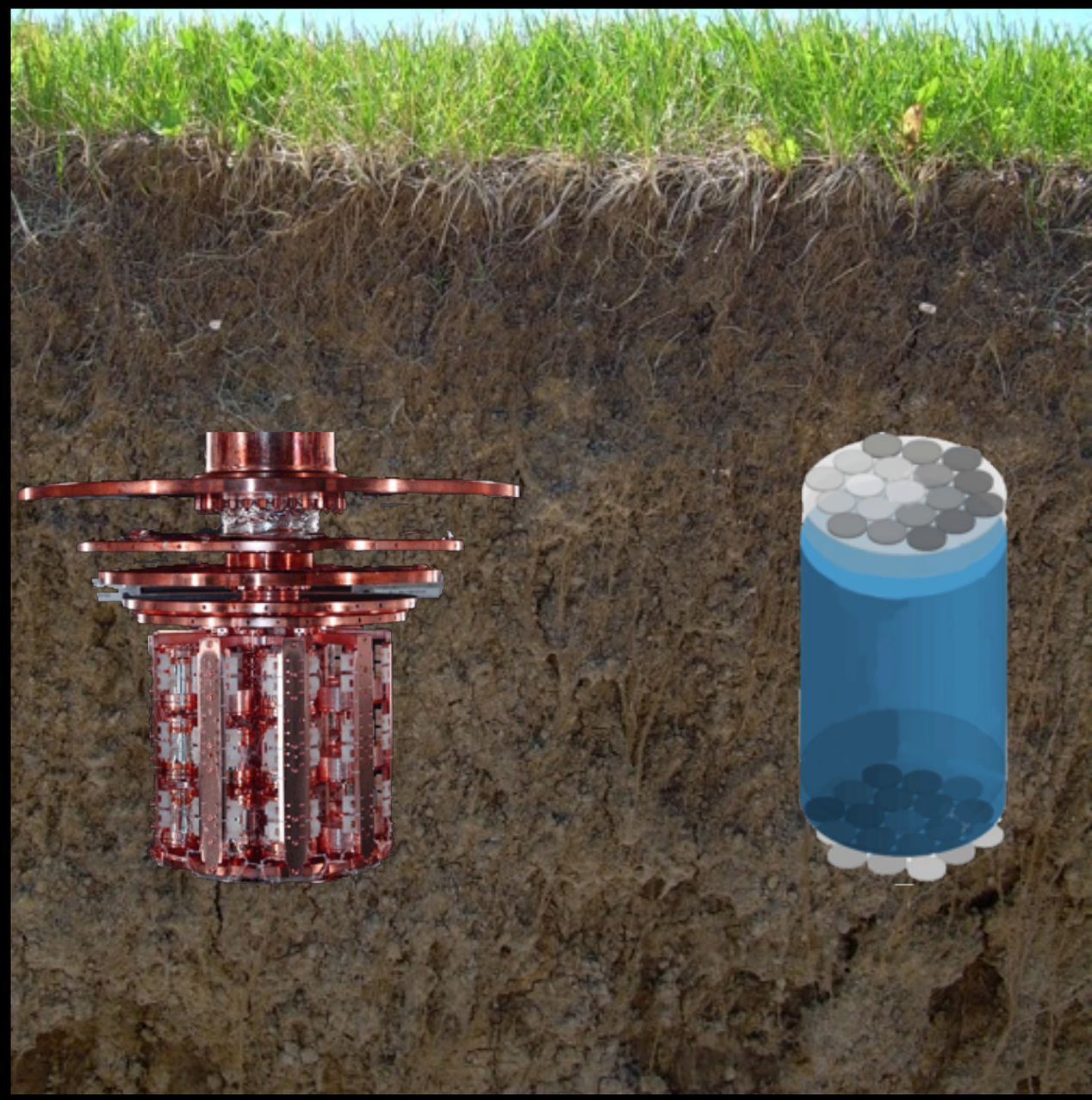
- It feels the gravitational force
- It does not feel the electromagnetic force or strong force
- We don’t know whether it feels the weak force



Looking for Dark Matter







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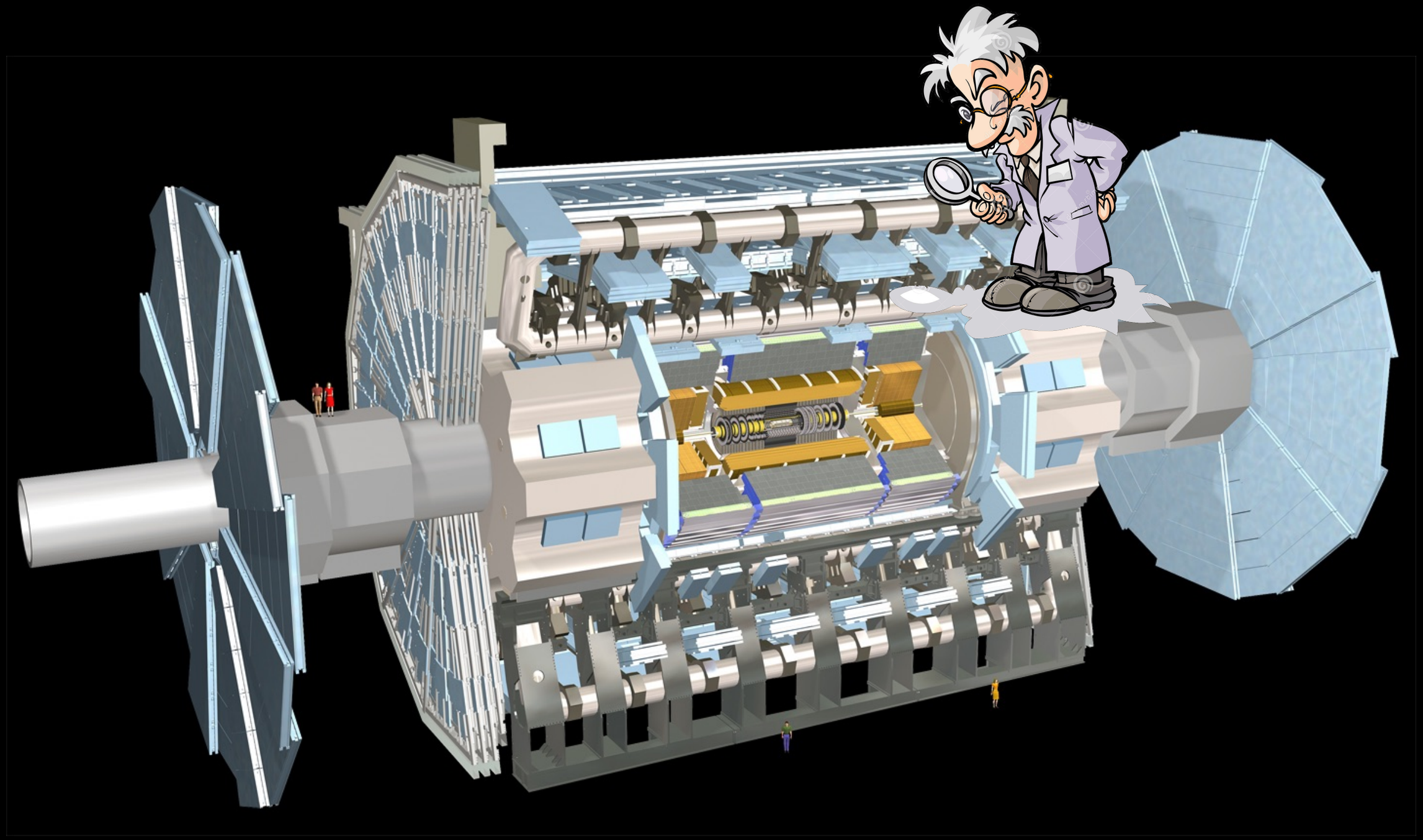

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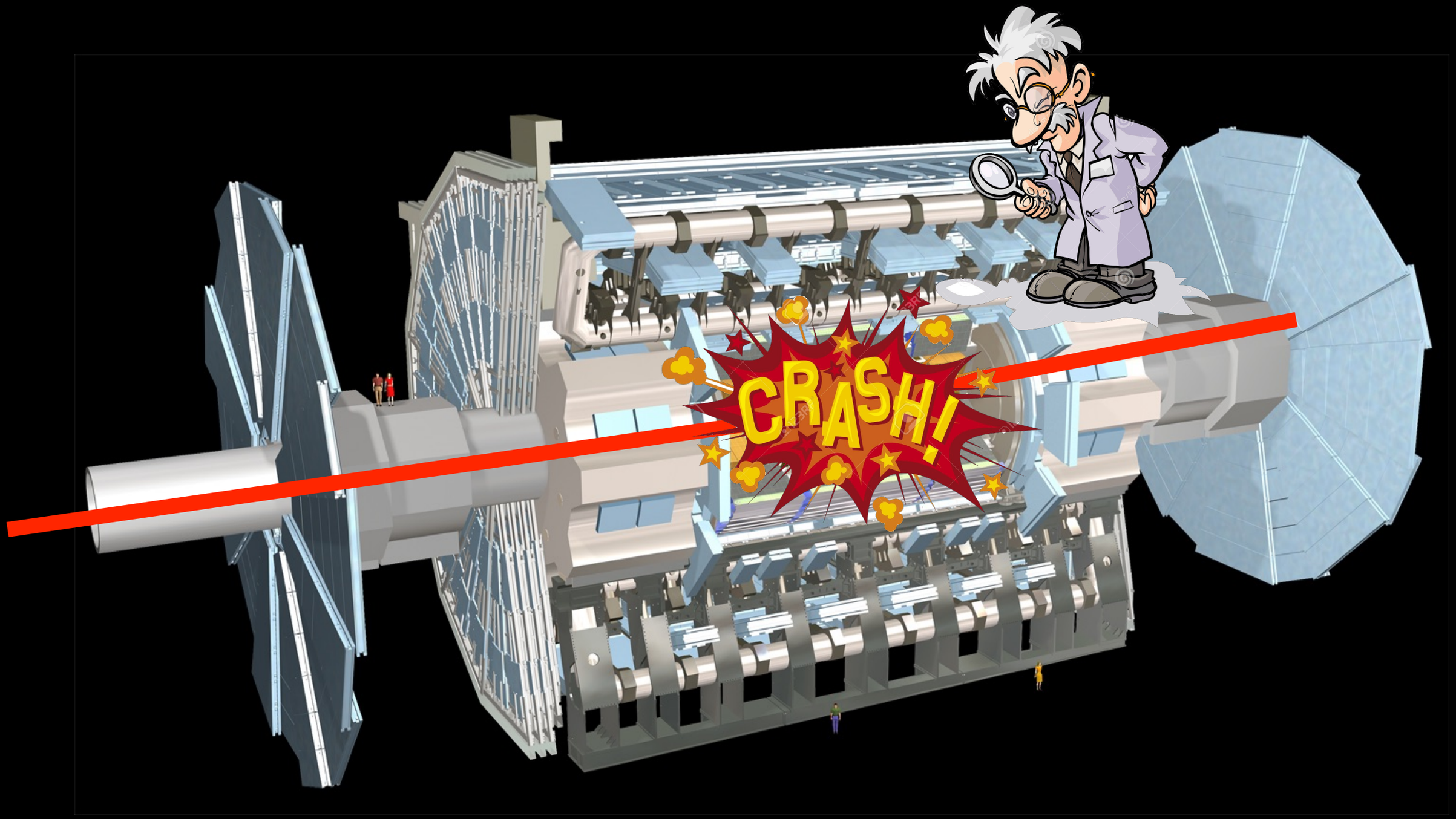

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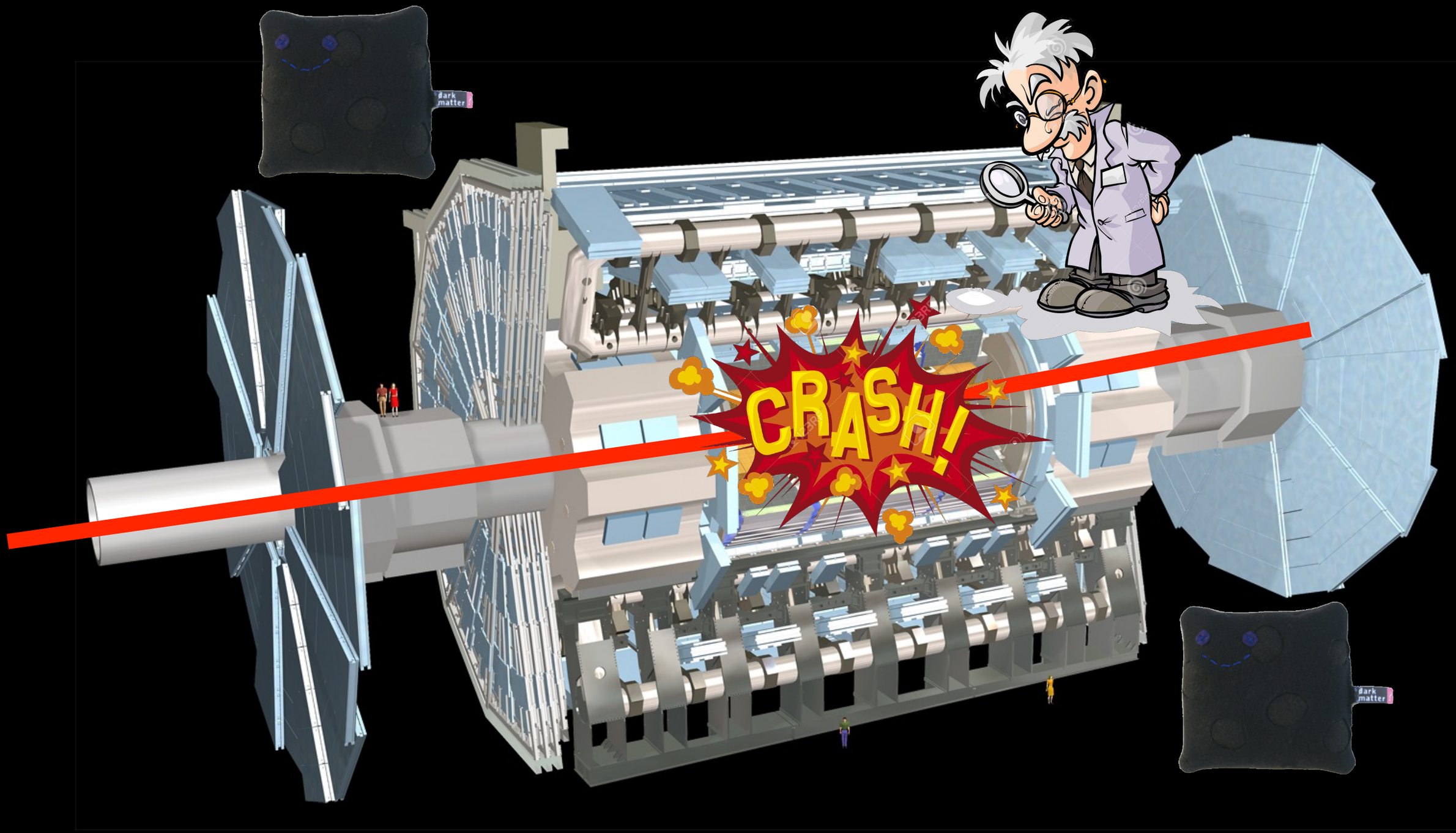

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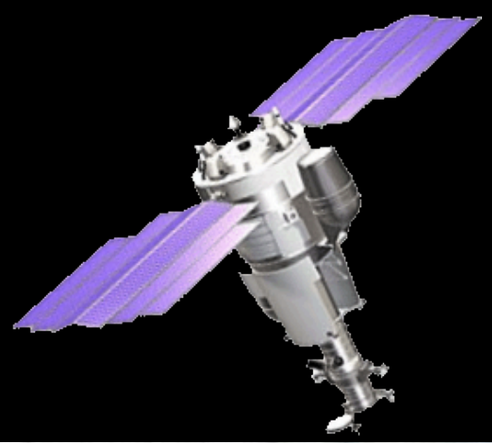

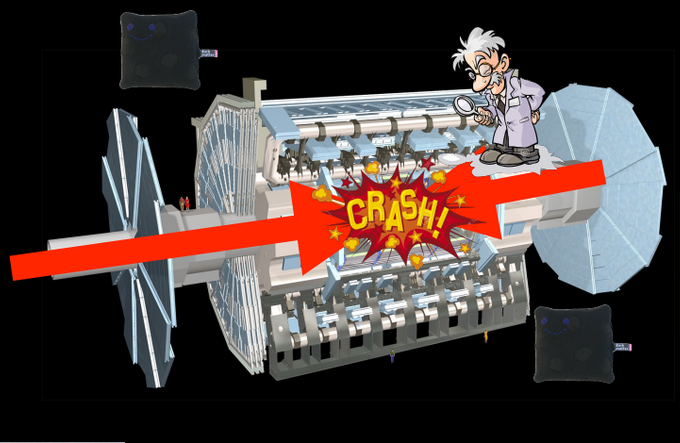

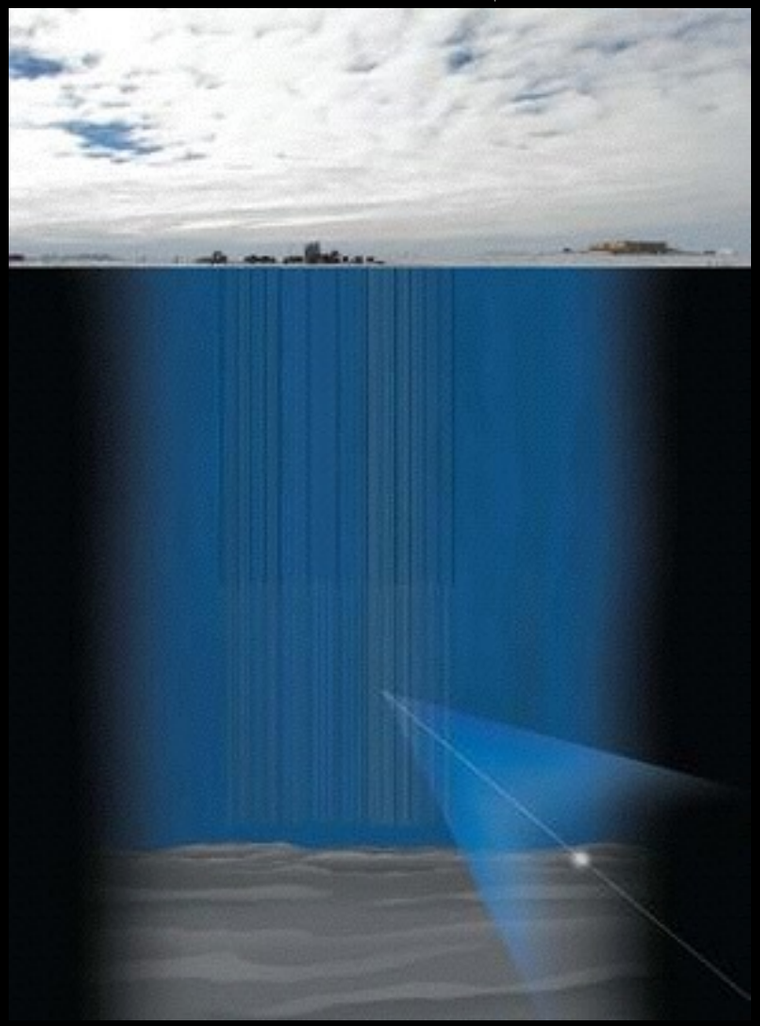

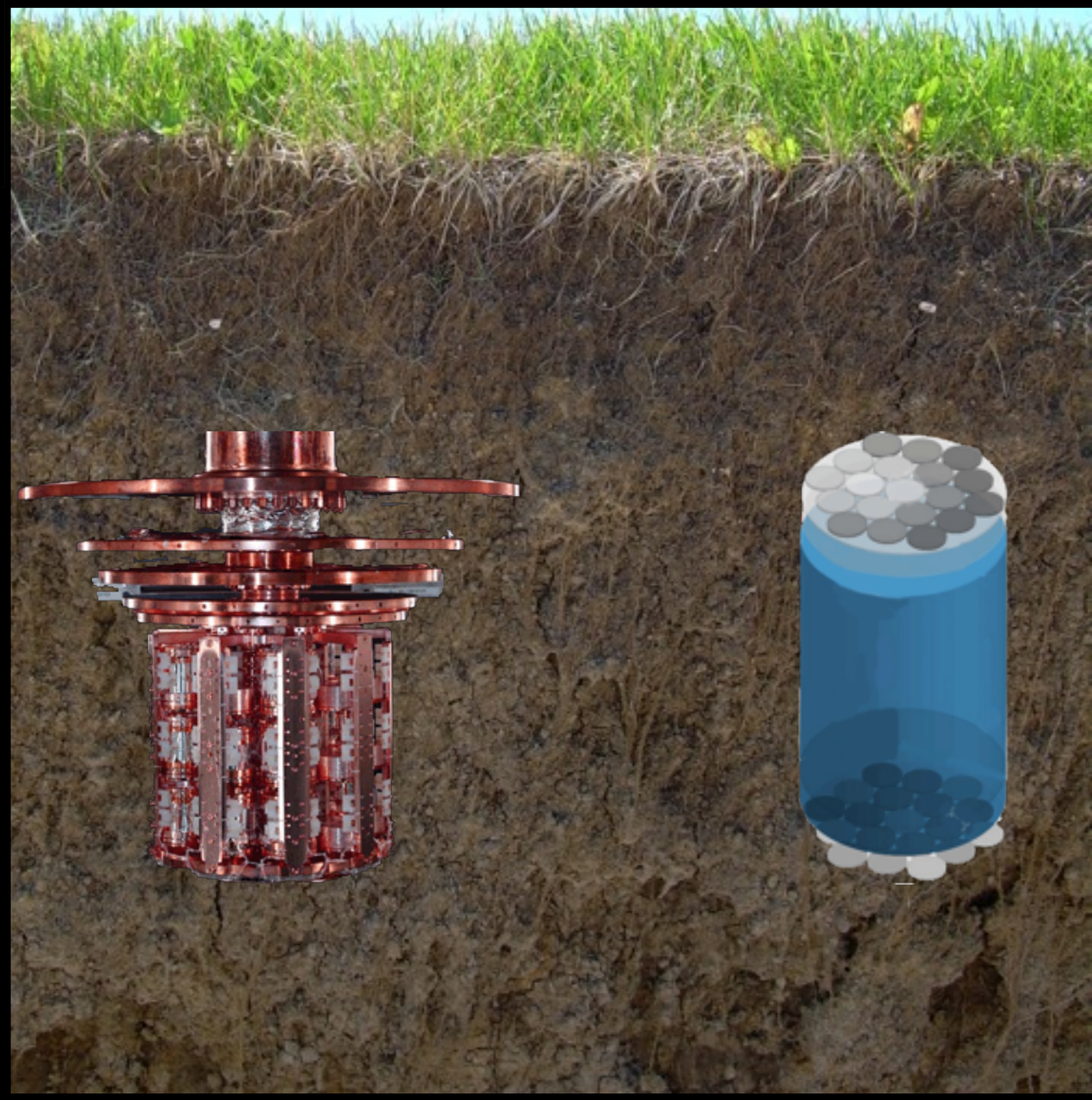

Looking for Dark Matter

- Underground to shield against ordinary matter
- Large volume of fluid surrounded by detectors
- Dark matter can pass through rock into detector
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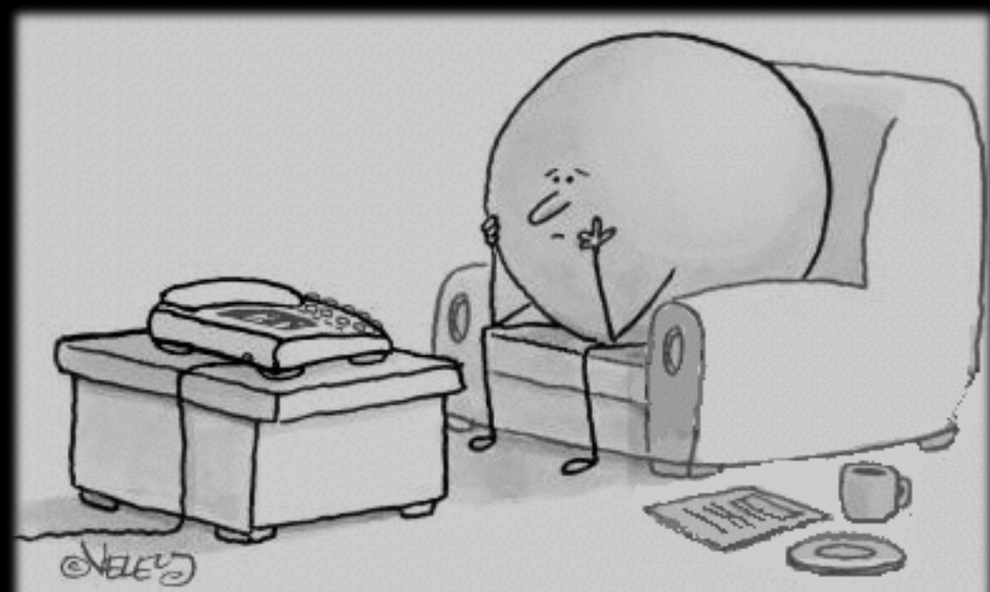
- Will occasionally bounce of the fluid
- Produces particles and light which can be detected



An unknown sub-atomic particle waiting to be discovered.

Image sources

- Particle Zoo: http://www.particlezoo.net/
- XENON: https://en.wikipedia.org/wiki/XENON
- ATLAS: http://www.atlas.ch
- PAMELA (satellite): http://www.multidark.es/index.php?option=com_content&view=article&id=8&Itemid=7&lang=en
- CRESST: http://www.interactions.org/cms/?pid=1034004
- crash cartoon: http://www.123rf.com/photo_19189251_cartoon--crash-comic-book-element.html
- scientist cartoon: http://www.123rf.com/photo_29465221_stock-vector-cartoon-scientist-with-a-magnifying-glass.html
- Earth photo: https://upload.wikimedia.org/wikipedia/commons/9/97/The_Earth_seen_from_Apollo_17.jpg
- PhD Comics http://www.phdcomics.com/comics.php?f=1430
- Astronomer Cartoon: www.Dreamstime.com
- Gravitational lensing: https://physicsforme.files.wordpress.com/2011/12/gravity-galaxy.jpg
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- Galaxy image: http://www.psd-dude.com/tutorials/resources-images/20-space-photoshop-tutorials/galaxy-tutorial.jpg