

本集内容

Dark matter 探测神秘的“暗物质”

学习要点

有关“theories（理论）”的词汇

边看边答

How can dark matter be detected?

文字稿

Look up at the skies and you see stars. But this telescope in the deserts of Chile is able to see the Universe as it really is, filled with a **mysterious** substance called dark matter. It can't be seen – but this instrument can detect dark matter by the way it distorts starlight.

仰望夜空，你会看到繁星点点。但这座位于智利沙漠中的望远镜能够看到宇宙的真实面貌，里面充满了一种**神秘的物质**，被称作“暗物质”。虽然暗物质不可见，但这台仪器可以通过暗物质扭曲星光的方式来探测到它。

Professor Ofer Lahav, University College London

This is a map of matter in the Universe.

奥弗·拉哈夫教授 伦敦大学学院

“这是宇宙物质的地图。”

And that's allowed astronomers to produce this map of how it's spread across the expanse of space.

这得以让天文学家们绘制出了这张地图，展现了暗物质在无尽的太空中的分布情况。

Professor Ofer Lahav, University College London

It's an element of, you know, **unveiling** mystery – something you couldn't see before, and suddenly it's there. And you think – wow!

奥弗·拉哈夫教授 伦敦大学学院

“这就好比**揭开**了一个谜团，你以前看不到的东西突然出现在眼前。你会称奇道绝！”

Pallab Ghosh, BBC Correspondent

So what is dark matter – and where is it in space? Well, let's start off with our own sun. It's one of a hundred billion stars that make up our galaxy – the Milky Way. Which, in turn, is one of countless others throughout the Universe. Dark matter permeates space, with galaxies like tiny gems on a **tangled** cosmic web.

帕拉布·戈什 BBC 通讯员

“什么是暗物质呢？它处于太空中的什么位置？让我们从恒星太阳说起。太阳是构成我们银河系中的千亿颗恒星之一。银河系继而也是宇宙中无数的星系之一。太空中到处都是暗物质，而星系就像是镶嵌在**错综复杂的**宇宙网上的一颗颗小宝石。”

The bright areas are where dark matter is most concentrated, and it's here that galaxies form. But the map is not what astronomers expected – the matter should be slightly more **clumped** together. Instead, it's smoother than predicted by Einstein's theory of general relativity, which helps determine how the matter should have spread out after the Big Bang.

亮处是暗物质最集中的地方，星系就是在这里形成的。但这张地图并不如天文学家所预期的那样，图中的物质本应稍微更**聚集**在一起。相反，它比爱因斯坦的广义相对论所预期得更平滑，广义相对论帮助确定了物质在大爆炸后应如何分布。

Dr Niall Jeffrey, Ecole Normale Superieure

If the structures in this map are smoother than we expect them to be, which is what the results seem to hint at, it means that Einstein's theory is wrong. So you might think that is a bad thing, that maybe 'oh no physics is broken', but for a physicist it's extremely exciting, because it means that we can find out something new about the way the Universe really is.

奈尔·杰弗里博士 巴黎高等师范学院

“如果这张地图中的结构比我们预期得要平滑，结果似乎也暗示了这一点，那就意味着爱因斯坦的理论是错误的。你可能认为这是一件坏事，也许会想：哦，物理学会彻底瓦解的，但对一名物理学家来说，这是极其令人振奋的，因为这意味着我们可以发现一些有关宇宙本质的新认知。”

Building on the work of Einstein, Carlos Frenk was among a group of scientists that developed the current model of cosmology.

卡洛斯·弗伦克的工作建立在爱因斯坦的理论基础之上，他是其中一位研发了当前宇宙学模型的科学家。

Professor Carlos Frenk, Durham University

Hearing now that there may be something not quite right with the theory is very disconcerting. It's very alarming – and in a way frightening to see that maybe my whole life's work might **crumble** in front of me. But at the same time, it is immensely exciting.

卡洛斯·弗伦克教授 杜伦大学

“现在听到爱因斯坦的理论可能有不太正确的地方，非常令人不安。这很吓人，在某种程度上，看到自己毕生的工作可能就要在我面前灰飞烟灭，是很可怕的。但与此同时，这也非常令人兴奋。”

Astronomers believe that we are at the start of a new revolution in cosmology that will give us a fuller understanding of how the Universe began – and how it will evolve.

天文学家相信，我们正处于宇宙学新革命的开端，这将使我们更全面地了解宇宙的起源，以及它将如何演变下去。

词汇

mysterious 神秘的

unveiling 揭开

tangled 错综复杂的

clumped 聚集分布

crumble 瓦解，崩溃

视频链接

<https://bbc.in/35x19av>

问题答案

Dark matter can be detected by the way it distorts starlight.