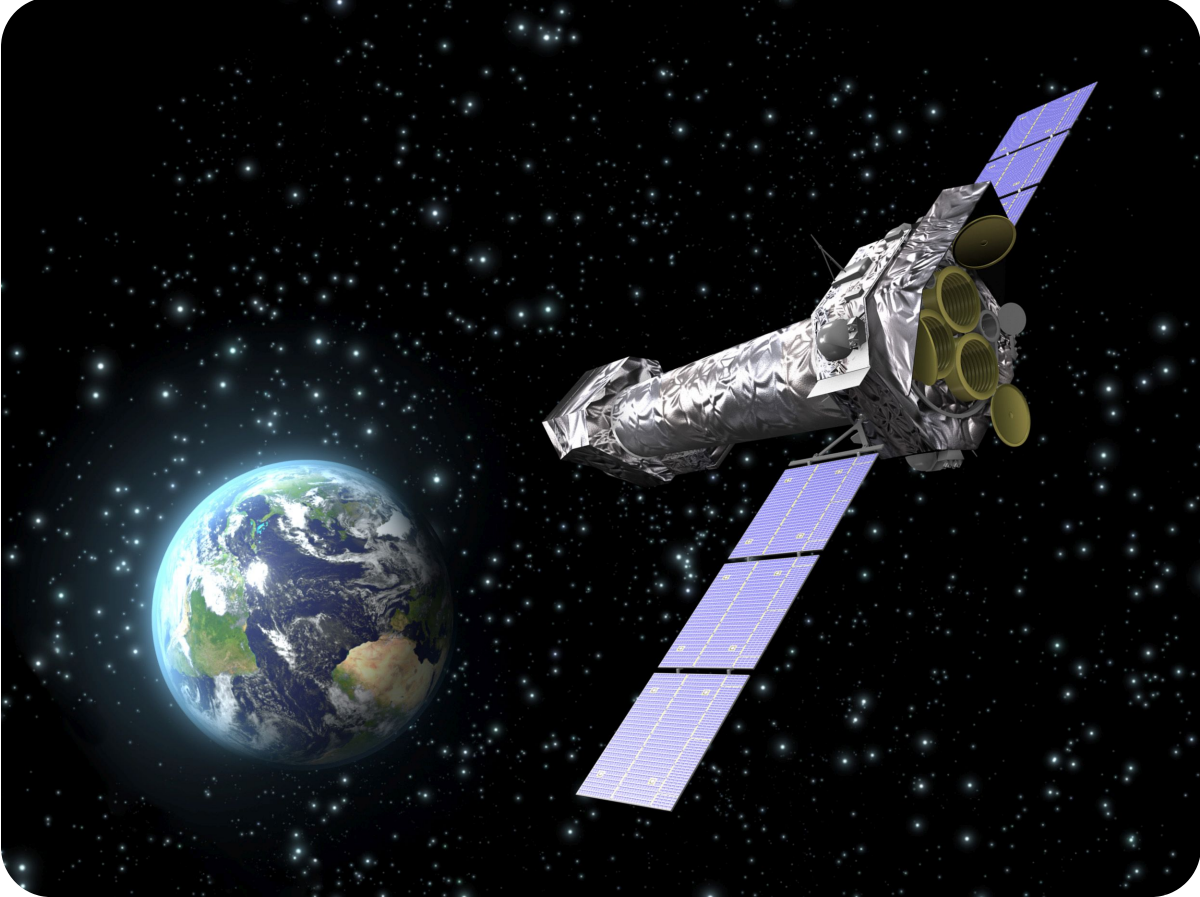


Astronomers use ESA space telescope to find missing matter

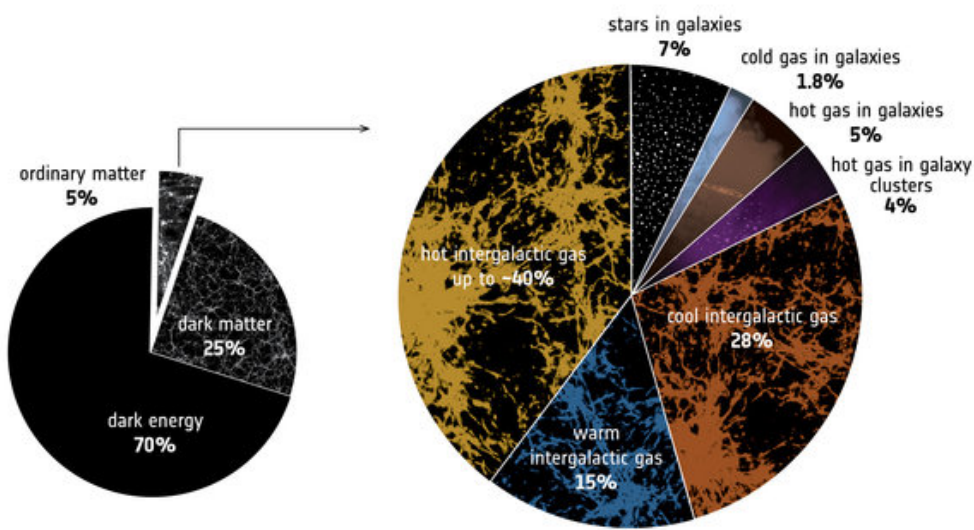


ESA's XMM-Newton is a space telescope that observes X-rays
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19 July 2018

Everything we see in space, such as stars, planets and even people, is made from a type of matter called baryons. However, a lot of the baryons in the Universe seem to be missing, and tracking them down has been very challenging. A group of astronomers using an ESA space telescope called XMM-Newton have been helping to solve this cosmic mystery!

We know how many baryons there should in the Universe by studying something called the Cosmic Microwave Background, which is the oldest light, dating to only 380,000 years after the Big Bang. All the baryons seem to be present for a few billion years, but then around half goes missing!

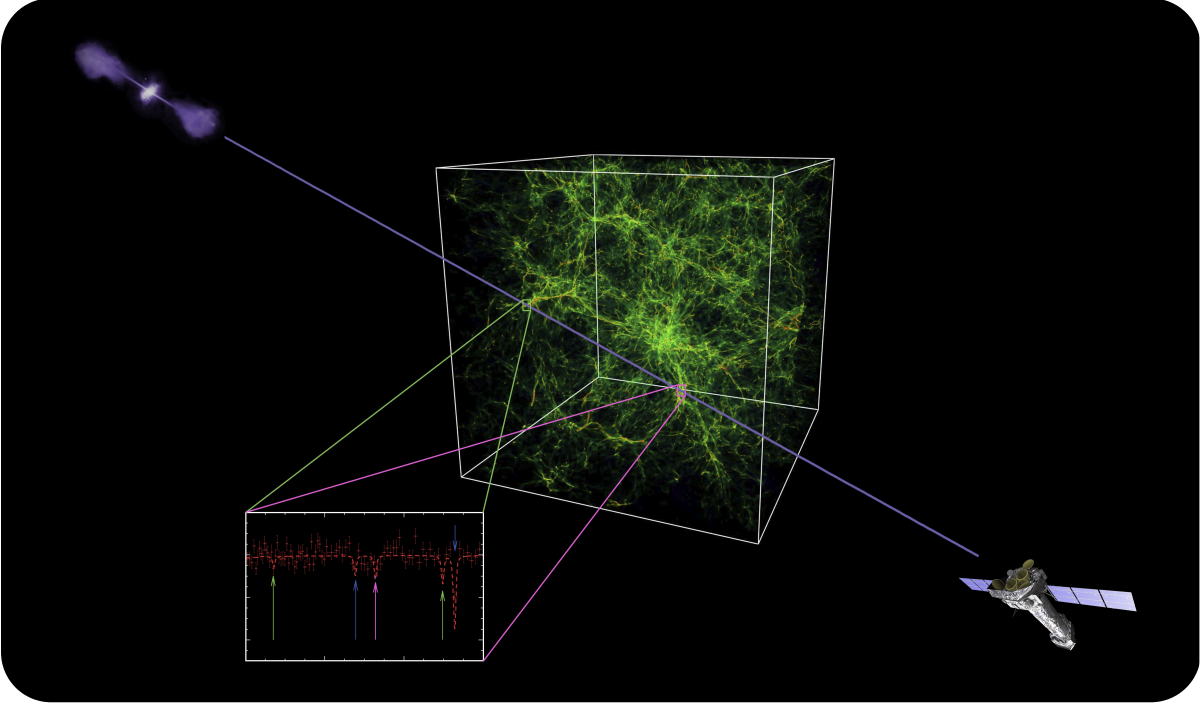


There is a lot of matter in the Universe!
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Fabrizio Nicastro is one of the scientists trying to solve this puzzle. He explains, "The missing baryons represent one of the biggest mysteries in modern astrophysics. We know this matter must be out there, we see it in the early Universe, but then we can no longer get hold of it. Where did it go?"

Counting up all the stars and gas in space, along with everything else the astronomers could find, still left 40% of the baryons missing. They are certainly good at hiding! Fabrizio and his friends decided to use a special telescope to help their search: ESA's XMM-Newton. This telescope is in space, and observes X-rays rather than the regular light that our eyes see.

The intrepid astronomers used XMM-Newton to look at a quasar, which is a massive galaxy with a supermassive black hole at its centre, pulling in material and giving out lots of X-rays! By carefully studying the data, they found signs of oxygen hidden in space between us and the quasar. We had never been able to see this before! Fabrizio explains, "There are huge reservoirs of material – including oxygen – lying there, and just in the amount we were expecting, so we finally can close the gap in the baryon budget of the Universe."



This picture shows ESA's XMM-Newton (bottom-right) observing the quasar (top-left), and finding the missing baryons in-between. The objects' sizes and distances have been changed to fit them into the picture!
[Access the image](#)

The missing baryons have been hiding in a kind of hot fog that extends for hundreds of thousands of light-years in the space between galaxies. The mystery has been solved, and now astronomers can begin to study these baryons to find out more about them!

Cool fact: Although baryonic matter makes up everything we see, it only amounts to 5% of the matter in the Universe! Mysterious dark matter makes up around 25%, and dark energy is around 70%.