

Looking for dark matter

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Abell cluster 520 / credit NASA /CXC / CFHT

Our observations show that the majority of the Universe is undetectable by our telescopes. A dark matter emitting no light but whose presence we detect could represent about 25% of the Universe's mass. This matter could be composed of unknown particles, ungraspable since they interact very weakly with visible matter. The challenge is then to identify phenomena related to the interaction with dark matter.

Hunting Dogs Galaxy - M51 / credit NASA / HHT

Galaxies rotate too quickly with regard to the mass of their luminous matter. For the gravitation laws to be respected, they must thus contain a significant proportion of invisible "dark matter". Many pieces of evidence have supported this idea, according to which only 5% of the total mass of the Universe would be made of visible matter, 25% of dark matter and some 70% of an even more enigmatic "dark energy". Several methods enable us to detect dark matter indirectly. In this picture of the Abell 520 cluster, the distribution of ordinary matter is shown in red and that of dark matter "inferred from the gravitational lens effect" in blue.