

Astronomers discover largest-ever dark matter structures spanning 270M light-years

February 21 2008

A University of British Columbia astronomer with an international team has discovered the largest structures of dark matter ever seen. Measuring 270 million light-years across, these dark matter structures criss-cross the night sky, each spanning an area that is eight times larger than the full moon.

“The results are a major leap forward since the presence of a cosmic dark matter web that extends over such large distances has never been observed before,” says Ludovic Van Waerbeke, an assistant professor in the Dept. of Physics and Astronomy.

To glimpse the unseen structures, the team of French and Canadian scientists “X-rayed” the dark matter, an invisible web that makes up more than 80 per cent of the mass of the universe.

The team used a recently developed technique called “weak gravitational lensing,” which is similar to taking an X-ray of the body to reveal the underlying skeleton. The study relied on data gathered from the world’s largest digital camera.

“This new knowledge is crucial for us to understand the history and evolution of the cosmos,” says Van Waerbeke. “Such a tool will also enable us to glimpse a little more of the nature of dark matter.”

The astronomers observed how light from distant galaxies is bent and distorted by webs of dark matter as it travels toward Earth. They then

mapped dark matter structures by measuring the distortions seen in these galaxy light patterns.

The study involved 19 researchers from 11 institutions and was led by UBC, the Institut d'Astrophysique de Paris, the Universite Pierre and Marie Curie (UPMC) and the University of Victoria. Van Waerbeke and his co-authors will publish their findings in a forthcoming issue of the journal *Astronomy and Astrophysics*. The submission can be seen at: arxiv.org/abs/0712.0884 .

The team spent several years developing the gravitational lensing tool, which is one of the major goals of the Canada-France-Hawaii-Telescope (CFHT) Legacy Survey.

The gravitational lensing technique also played a pivotal role in another recent study: *Astronomers produce first detailed map of dark matter in a supercluster* -- www.physorg.com/news119182387.html

Source: University of British Columbia

Citation: Astronomers discover largest-ever dark matter structures spanning 270M light-years (2008, February 21) retrieved 20 April 2024 from <https://phys.org/news/2008-02-astronomers-largest-ever-dark-spanning-270m.html>

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