Scientists search for dark galaxies through the AGES

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First results from the Arecibo Galaxy Environment Survey (AGES) suggest the discovery of a new dark galaxy. The AGES survey, which started in January 2006, is the most sensitive, large-scale survey of neutral hydrogen to date. Neutral hydrogen is found in most galaxies and it is a key tool in the search for dark galaxies as it can be detected even when there are no stars or other radiation sources to "shine a light" on matter.

The new candidate dark galaxy is located near NGC1156, an apparently isolated, irregularly-shaped galaxy found at the edge of the Aries constellation. The first observations in the AGES programme identified a number of new galaxies. One newly discovered source is approximately 153 million light-years from Earth and appears to be 200,000 light-years across. There is no obvious optical counterpart to the massive object.

Robbie Auld, who is presenting the results at the RAS National Astronomy Meeting in Leicester on 6th April, said, "The new source showed up clearly in the AGES survey as it contains huge amounts of hydrogen gas but it was missed in all previous searches as it doesn't appear to contain many bright stars. The interactions between hydrogen atoms in cosmic gas clouds are enough to stimulate light emission at the neutral hydrogen "fingerprint" wavelength of 21cm. In the first stage of the AGES campaign, we have used the Arecibo radio telescope to search at this wavelength, looking for galaxies that have remained hidden from astronomers in the past. We now need to follow up observations at other

wavelengths and work out exactly how many stars this new galaxy may or may not contain."

The AGES programme, which will last for four years, is led by Cardiff University's Dr Jonathan Davies. In addition to the Arecibo radio telescope, AGES will use a network of ground-based and space-based telescopes to observe the sky in many different wavelengths. Among those used will be the UK Infrared Telescope in Hawaii, the GALEX ultraviolet space telescope, the Hubble Space Telescope.

The techniques used in AGES have already been used on a small scale and have led to the discovery of VIRGOHI21, the first galaxy to be detected with gas, large amounts of the mysterious dark matter but no visible stars. By discovering more objects like VIRGOHI21 scientist hope to answer one of the greatest cosmological questions: if, as theoreticians predict, matter in the Universe is mainly dark then where does is all reside? The AGES team hopes that the survey will reveal exactly how much matter is hidden in dark galaxies and determine whether current theories are correct.

Source: Royal Astronomical Society