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Indirect Dark Matter Searches with the MAGIC Telescopes

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The Major Atmospheric Gamma-ray Imaging Cherenkov (MAGIC) Telescopes form a ground-based system of two, 17 m diameter Imaging Atmospheric Cherenkov Telescopes (IACT) located in the Canary island of La Palma. The first telescope, MAGIC-I has been operational since 2004, and it has already achieved the lowest energy threshold among the current generation of IACTs. In 2009 it was joined by MAGIC-II. The stereoscopic mode allows observations with significantly improved sensitivity, lower energy threshold and improved energy and angular resolutions.

The search for DM with MAGIC is pursued by collecting signatures of very-high energy (VHE) gamma-rays originating from the annihilation of hypothetical DM particles. The gamma-ray spectrum resulting from DM annihilation should bear distinctive features, correlated to the DM particle mass, which, in the case of WIMPs, is predicted to be exactly at VHE range and, therefore, detectable by IACTs . However, identification of these features is a challenge, since the potential DM signal usually remains invisible under the dominant gamma-radiation from conventional astrophysical objects. For this reason, we direct our search with MAGIC to the objects with large amounts of DM that, at the same time, are far enough from the Galactic plane so that the DM signal is clearer. Some of such sources observed by MAGIC include dwarf spheroidal galaxies and galaxy clusters.

Here we report and discuss recent results of the indirect DM searches performed with MAGIC, and also present prospects for the future stereoscopic observations.

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