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Indirect Searches for Dark Matter at the TeV Scale and Above[1]

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The existence of dark matter, or matter which does not readily emit or absorb electromagnetic radiation, is supported by a wealth of astrophysical evidence. However, despite many years of observations the particle nature of dark matter remains unknown. In the past decade the high-energy physics community has undertaken major efforts to solve the mystery of dark matter by directly observing it in the laboratory. In parallel, a complementary effort of "indirect" detection is underway at astrophysical particle observatories. Using measurements of astrophysical gamma rays, neutrinos, and cosmic rays it is possible to study dark matter candidates which decay or annihilate into Standard Model particles. These measurements allow us to probe dark matter at the TeV scale, above the reach of laboratory experiments, and at the sub-eV scale. In this talk I will highlight indirect measurements of dark matter annihilation above 1 TeV using data from facilities such as the High Altitude Water Cherenkov (HAWC) Gamma-ray Observatory and the IceCube Neutrino Observatory. I will discuss the prospects for detecting dark matter using TeV cosmic rays, gamma rays, and neutrinos, the model dependence and systematic uncertainties of the observations, and connections to measurements in the laboratory.

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