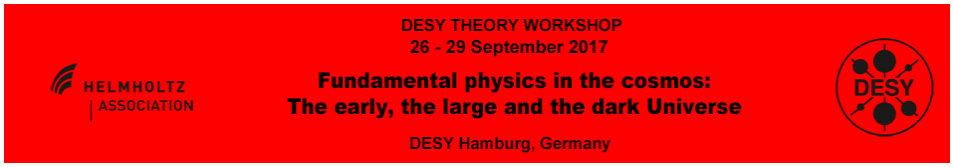

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Constraining particle dark matter using local galaxy distribution

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It has been long discussed that cosmic rays may contain signals of dark matter. In the last couple of years an anomaly of cosmic-ray positrons has drawn a lot of attentions, and recently an excess in cosmic-ray anti-proton has been reported by AMS-02 collaboration. Both excesses may indicate towards decaying or annihilating dark matter with a mass of around 1–10 TeV. In this article we study the gamma rays from dark matter and constraints from cross correlations with distribution of galaxies, particularly in a local volume. We find that gamma rays due to inverse-Compton process have large intensity, and hence they give stringent constraints on dark matter scenarios in the TeV scale mass regime. Taking the recent developments in modeling astrophysical gamma-ray sources as well as comprehensive possibilities of the final state products of dark matter decay or annihilation into account, we show that the parameter regions of decaying dark matter that are suggested to explain the excesses are excluded. We also discuss the constrains on annihilating scenarios.

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