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Searching for spectral features in the gamma-ray sky

The search for gamma-rays produced in dark matter annihilations or decays is hindered by the existence of large astrophysical backgrounds, which usually overwhelm the faint signal expected from exotic processes. A promising strategy to indirectly search for dark matter annihilations or decays is then to search for spectral features which might stand out over the featureless diffuse background even for moderate values of the annihilation cross section or the decay rate. In this research project we plan to search for spectral features in the gamma-ray sky using data from present gamma-ray telescopes as well as to estimate the sensitivity of the future instruments GAMMA-400 and CTA. We also plan to study the interplay of the limits from gamma-ray observations with the limits from antiprotons, positrons or neutrinos, as well as from other detection methods. Lastly, we plan to construct concrete dark matter models generating sharp spectral features.