Abstract Submitted
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Cosmic-ray electron signatures of dark matter MARTIN POHL, Iowa State University — There is evidence for an excess in cosmic-ray electrons at about 500 GeV energy, that may be related to dark-matter annihilation. I have calculated the expected electron contributions from a pulsar and from Kaluza-Klein dark matter, based on a realistic treatment of the electron propagation in the Galaxy. Both pulsars and dark-matter clumps are quasi-pointlike and few, and therefore their electron contributions at Earth generally have spectra that deviate from the average spectrum one would calculate for a smooth source distribution. I find that pulsars younger than about 10^5 years naturally cause a narrow peak at a few hundred GeV in the locally observed electron spectrum, similar to that observed. On the other hand, for a density $n_c = 10$ kpc^{-3} of dark-matter clumps the sharp cut-off in the contribution from Kaluza-Klein particles is sometimes more pronounced, but often smoothed out and indistinguishable from a pulsar source, and therefore the spectral shape of the electron excess is insufficient to discriminate a dark-matter origin from more conventional astrophysical explanations. The amplitude of variations in the spectral feature caused by dark matter predominantly depends on the density of dark-matter clumps, which is not well known.

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