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M31 gamma ray emission - a closer look at different explanations

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A new measurement of a spatially extended gamma-ray signal from the center of M31 was published recently, reporting that the emission broadly resembles the so-called Galactic center excess of the Milky Way (Ackermann et al. 2017, arXiv:1702.08602). In this talk we discuss the possibilities that the signal originates from a population of millisecond pulsars, or alternatively the annihilation of dark matter particles. As an astrophysical interpretation in terms of millisecond pulsars appears viable, we derive upper limits on the annihilation cross section in the $b\bar{b}/\tau^{-}\tau^{+}-$channel of Weakly Interacting Massive Particles (WIMPs) in a mass range from 1 GeV to 10 TeV, taking into consideration different spatial dark matter density profiles and including the effect of substructure and adiabatic contraction.

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