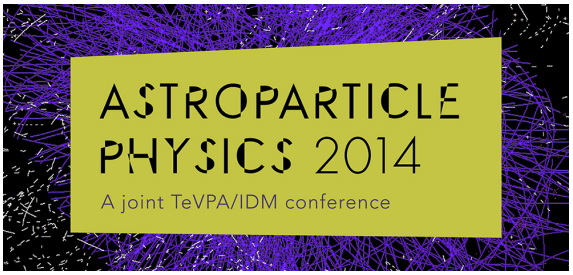

Contribution ID: **9** Type: **Presentation**

Decaying Dark Matter inside Neutron stars

Tuesday, June 24, 2014 6:05 PM (15 minutes)

We propose that the existing population of neutron stars in the galaxy can help constrain the nature of decaying dark matter. The amount of decaying dark matter, accumulated in the central regions in neutron stars and the energy deposition rate from decays, may set a limit on the neutron star survival rate against transitions to more compact stars and, correspondingly, on the dark matter particle decay time, τ_χ. We find that for masses (m_χ/TeV)
gtrsim9×10^{-4} or (m_χ/TeV)
gtrsim5×10^{-2} in the bosonic or fermionic cases, lifetimes τ_χ
$lesssim 10^{55}$ s or τ_χ
$lesssim 10^{53}$ s are excluded respectively. These results may pose a problem for models including dark matter with smaller lifetimes aimed to explain the galactic excess in the ratio of positrons to electrons.

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Session Classification: Gamma-Ray Astrophysics

Track Classification: Gamma-Ray Astrophysics