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Dark matter, neutron stars and strange quark matter[1] M. ANGELES PEREZ-GARCIA, Department of Fundamental Physics and IUFFYM, Salamanca, Spain, JIRINA STONE, Astrophysics, Department of Physics, University of Oxford, Keble Road Ox1 3RH, Oxford, UK and Dpt of Physics and Astronomy, U. of Tennessee USA, JOSEPH SILK, Astrophysics, Department of Physics, University of Oxford, Keble Road Ox1 3RH, Oxford, United Kingdom — The energy release due to neutralino WIMP self-annihilation in the thermalization volume inside a compact object is shown to be comparable to the energy needed to create a long-lived lump of strange quark matter, or strangelet, for WIMP masses above a few GeV. Since strange matter is the most stable state of matter, accretion of self-annihilating dark matter onto neutron stars provides a mechanism to seed compact objects with lumps of strange quark matter and this effect may trigger a conversion of most of the star into a strange star. Using an energy estimate based on the Fermi gas model combined with the MIT bag model for the long-lived strangelet, a new limit on the possible values of the WIMP mass can be set that is competitive with those from direct searches. Our limit is especially important for subdominant species of massive neutralinos.

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M. Angeles Perez-Garcia
Department of Fundamental Physics and IUFFYM, Salamanca, Spain

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