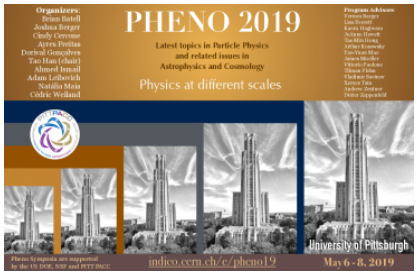

Contribution ID: **716** Type: **parallel talk**

Dark Quark Nuggets

Tuesday 7 May 2019 18:00 (15 minutes)

"Dark quark nuggets", a lump of dark quark matter, can be produced in the early universe for a wide range of confining gauge theories and serve as a macroscopic dark matter candidate. The two necessary conditions, a nonzero dark baryon number asymmetry and a first-order phase transition, can be easily satisfied for many asymmetric dark matter models and QCD-like gauge theories with a few massless flavors. For confinement scales from 10 keV to 100 TeV, these dark quark nuggets with a huge dark baryon number have their masses vary from 10^{23} g to 10^{-7} g and their radii from 10^{8} cm to 10^{-15} cm. Such macroscopic dark matter candidates can be searched for by a broad scope of experiments and even new detection strategies. Specifically, we have found that the gravitational microlensing experiments can probe heavier dark quark nuggets or smaller confinement scales around 10 keV; collision of dark quark nuggets can generate detectable and transient electromagnetic radiation signals; the stochastic gravitational wave signals from the first-order phase transition can be probed by the pulsar timing array observations and other space-based interferometry experiments; the approximately massless dark mesons can behave as dark radiation to be tested by the next-generation CMB experiments; the free dark baryons, as a subcomponent of dark matter, can have direct detection signals for a sufficiently strong interaction strength with the visible sector.

Summary

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