Abstract Submitted
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Heavy Dark Matter and High Energy Cosmic Rays KYLE LAWSON, University of British Columbia — Conventional dark matter models assume that the dark matter is composed of new fundamental particles which interact only weakly with visible matter. One alternative to this picture is a model in which the dark matter is actually composed of standard model quarks (or antiquarks) bound into macroscopically large composite objects. If these objects are sufficiently massive they become unobservable due to their correspondingly small number density. For dark matter with very low density experimental searches are limited by detector size rather than sensitivity. I will outline the basic properties of quark nugget dark matter and analyze their interactions with molecules of earth's atmosphere. Depending on the nature of the quark matter involved the total energy deposited can be observably large. In this case the quark nugget will trigger an extensive air shower similar to that initiated by a single ultrahigh energy proton or nucleus. As such, it is possible that large scale cosmic ray experiments are capable of detecting this type of dark matter. A dark matter signal may be seen in both fluorescence and surface detectors as well as in radio detection experiments. I will offer a description of the potential signal in each of these channels and a brief summary of detection potential.

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