



Contribution ID: 131

Type: **Presentation**

## Search for Light Dark Matter with X-rays and Implications of a Possible Detection

*Wednesday, June 25, 2014 3:20 PM (20 minutes)*

After briefly summarizing previous constraints on dark matter candidates that produce X-ray emission lines via radiative decay, with an emphasis on the sterile neutrino and moduli dark matter, I present the recent detection by our team of a candidate dark matter feature at  $\sim 3.56$  keV. This weak unidentified emission line was discovered by stacking XMM-Newton spectrum of 73 galaxy clusters – a method that minimizes statistical and systematic uncertainties. The implications for identifying the dark matter particle and for physics beyond the Standard Model are discussed. I also indicate the uncertainties and caveats that remain with respect to the significance of the line and its interpretation as originating from dark matter decay. I look forward to future work that can narrow down the possible interpretations – focusing on the prospects of observations with the high energy resolution Soft X-ray Spectrometer, the featured detector aboard the Astro-H X-ray Observatory scheduled for a 2015 launch.

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**Session Classification:** Dark Matter: Indirect Detection

**Track Classification:** Dark Matter Indirect Detection