



Contribution ID: 8

Type: not specified

The 3.5 keV line in Perseus: Evidence for Fluorescent Dark Matter

Thursday, 12 January 2017 12:15 (25 minutes)

An excess of X-Rays at 3.5 keV detected in various galaxies and clusters, including the Perseus cluster, has generated a lot of excitement as a potential Dark Matter signal. Hitomi observations of Perseus with the Soft X-ray Spectrometer (SXS) provide a high-resolution look at the 3.5 keV feature. The Hitomi spectrum – which involves the sum of diffuse cluster emission and the point-like central Active Galactic Nucleus (AGN) – does not show any excess at $E \sim 3.5\text{keV}$, giving an apparent inconsistency with previous observations of excess diffuse emission. We point out that 2009 Chandra data reveals a strong dip in the AGN spectrum at $E = (3.54 \pm 0.02)\text{ keV}$ (cluster frame) – the identical energy to the diffuse excess observed by XMM-Newton. Scaling this dip to the 2016 AGN luminosity and adding it to the diffuse XMM-Newton excess, this predicts an overall dip in the SXS field of view of $(-7.7 \pm 4.6) \times 10^{-6}\text{ ph cm}^{-2}\text{ s}^{-1}$ at $E = 3.54\text{ keV}$, a precise match to the Hitomi data when broadened by the dark matter virial velocity. We describe models of Fluorescent Dark Matter that can reproduce this physics, in which dark matter absorbs and then re-emits 3.5 keV photons emitted from the central AGN.

Primary author: Mr JENNINGS, Nicholas (University of Oxford)

Presenter: Mr JENNINGS, Nicholas (University of Oxford)

Session Classification: Parallel Sesion: Dark Matter