Contribution ID: **82** Type: **Invited talk in the parallel session**

Probing the nature of dark matter with Milky Way subhaloes

Wednesday, 7 July 2021 10:00 (25 minutes)

The nature of dark matter is expected to be most strongly expressed in dark matter subhaloes with mass $< 10^9 \mathrm{M}_\odot$. These subhaloes are accessible to us in the vicinity of the Milky Way (MW), through the abundance and structure of both luminous MW satellites and dark subhaloes that never form stars. In this talk I will present work on the properties of these subhaloes in two radically different dark matter models. First, I will demonstrate how a self-interacting dark matter (SIDM) model with a strongly velocity-dependent self-interaction cross-section can initiate gravothermal collapse in subhaloes, and can subsequently explain the surprisingly similar densities of bright and faint MW satellites. Second, I will switch to the warm dark matter (WDM) model, and consider its consequences for the radial distribution of luminous satellites and dark subhaloes relative to the cold dark matter (CDM) model. I will show that subhaloes closer to the MW centre (< 40kpc) are the remnants of relatively massive haloes that appear in similar numbers in CDM and WDM. This is the region in which gaps in stellar streams are used to constrain dark matter subhalo abundances, therefore we show that limits on WDM are somewhat weaker than if we had extrapolated the change in subhalo abundance from what we measure in the halo at large (< 300kpc). I will end my talk with a brief change of topic, making a prediction for the properties of possible dark matter decay X-ray emission lines in galaxy clusters to be probed by the upcoming XRISM observatory.

Primary author: LOVELL, Mark (University of Iceland)

Presenter: LOVELL, Mark (University of Iceland)

Session Classification: Dark Matter: Beyond LCDM

Track Classification: Dark Matter: Dark Matter: Beyond LCDM