



Contribution ID: 19

Type: **Talk in the parallel session**

Strong constraints on thermal relic dark matter from Fermi-LAT observations of the Galactic Center

Friday, 9 July 2021 08:54 (12 minutes)

The extended excess towards the Galactic Center (GC) in gamma rays inferred from Fermi-LAT observations has been interpreted as being due to dark matter (DM) annihilation. In a recent paper my collaborators and I performed a new likelihood analyses of the GC and showed that when including templates for the stellar galactic and nuclear bulges, the GC shows no significant detection of a DM annihilation template, even after generous variations in the Galactic diffuse emission (GDE) models and a wide range of DM halo profiles. We include Galactic diffuse emission models with combinations of 3D inverse Compton maps, variations of interstellar gas maps, and a central source of electrons. For the DM profile, we include both spherical and ellipsoidal DM morphologies and a range of radial profiles from steep cusps to kiloparsec-sized cores, motivated in part by hydrodynamical simulations. Our derived upper limits on the dark matter annihilation flux place strong constraints on DM properties. In the case of the pure b-quark annihilation channel, our limits on the annihilation cross section are more stringent than those from the Milky Way dwarfs up to DM masses of \sim TeV, and rule out the thermal relic cross section up to \sim 300 GeV. Better understanding of the DM profile, as well as the Fermi-LAT data at its highest energies, would further improve the sensitivity to DM properties.

Primary author: KEELEY, Ryan (Korea Astronomy Space Science Institute)

Co-authors: MACIAS, Oscar (GRAPPA); ABAZAJIAN, Kevork (UC, Irvine); KAPLINGHAT, Manoj (UC, Irvine); HORIUCHI, Shunsaku (Virginia Tech)

Presenter: KEELEY, Ryan (Korea Astronomy Space Science Institute)

Session Classification: Dark Matter Detection

Track Classification: Dark Matter: Dark Matter Detection