Contribution ID: **58** Type: **Oral presentation**

Assessing the Impact of Hydrogen Absorption on the Characteristics of the Galactic Center Excess

Thursday 21 July 2022 14:40 (20 minutes)

We present a new reconstruction of the distribution of atomic hydrogen in the inner Galaxy that is based on explicit radiation-transport modelling of line and continuum emission and a gas-flow model in the barred Galaxy that provides distance resolution for lines of sight toward the Galactic Center. The main benefits of the new gas model are, a), the ability to reproduce the negative line signals seen with the HI4PI survey and, b), the accounting for gas that primarily manifests itself through absorption.
We apply the new model of Galactic atomic hydrogen to an analysis of the diffuse gamma-ray emission from the inner Galaxy, for which an excess at a few GeV was reported that may be related to dark matter. We find with high significance an improved fit to the diffuse gamma-ray emission observed with the Fermi-LAT, if our new HI model is used to estimate the cosmic-ray induced diffuse gamma-ray emission. The fit still requires a nuclear bulge at high significance. Once this is included there is no evidence for a dark-matter signal, be it cuspy or cored. But an additional so-called boxy bulge is still favoured by the data. This finding is robust under the variation of various parameters, for example the excitation temperature of atomic hydrogen, and a number of tests for systematic issues.

Author: Dr MACIAS, Oscar (GRAPPA (University of Amsterdam))

Co-authors: Dr PHAEDRA, Coleman (University of Canterbury); POHL, Martin; Dr CHRIS, Gordon (University of Canterbury)

Presenter: Dr MACIAS, Oscar (GRAPPA (University of Amsterdam))

Session Classification: Parallel 3C - Indirect searches