



Contribution ID: 25

Type: **not specified**

Strong support for the millisecond pulsar origin of the Galactic center GeV excess

Tuesday 22 September 2015 11:10 (20 minutes)

Using gamma-ray data from the Fermi Large Area Telescope, various groups have identified a clear excess emission in the inner Galaxy, at energies around a few GeV. This excess resembles remarkably well a signal from dark matter annihilation. One of the most compelling astrophysical interpretations is that the excess is caused by the combined effect of a previously undetected population of dim gamma-ray sources. Due to their spectral similarity, the best candidates are millisecond pulsars. Here, we search for this hypothetical source population, using a novel approach based on wavelet decomposition of the gamma-ray sky and the statistics of Gaussian random fields. Using almost seven years of Fermi-LAT data, we detect a clustering of photons as predicted for the hypothetical population of millisecond pulsar, with very high statistical significance. For plausible values of the luminosity function, this population can explain 100% of the observed excess emission. We show that other extragalactic or Galactic sources, a mis-modeling of Galactic diffuse emission, or the thick disk population of pulsars are unlikely to account for this observation.

Author: WENIGER, Christoph (University of Amsterdam)

Presenter: WENIGER, Christoph (University of Amsterdam)

Session Classification: Indirect Detection