

## Millisecond Pulsars and the Galactic Center Excess

**Abstract:** Various groups including the Fermi team have confirmed the spectrum of the gamma-ray excess in the Galactic Center (GCE). While some authors interpret the GCE as evidence for the annihilation of dark matter (DM), others have pointed out that the GCE spectrum is nearly identical to the average spectrum of Fermi millisecond pulsars (MSP). Assuming the Galactic Center (GC) is populated by a yet unobserved source of MSPs that has similar properties to that of MSPs in the Galactic Disk (GD), we present results of a population synthesis of MSPs from the GC. We establish parameters of various models implemented in the simulation code by matching characteristics of 54 detected Fermi MSPs in the first point source catalog and 92 detected radio MSPs in a select group of thirteen radio surveys and targeting a birth rate of 45 MSPs per mega-year. As a check of our simulation, we find excellent agreement with the estimated numbers of MSPs in eight globular clusters. In order to reproduce the gamma-ray spectrum of the GCE, we need to populate the GC with 10,000 MSPs having a Navarro-Frenk-White distribution suggested by the halo density of DM. It may be possible for Fermi to detect some of these MSPs in the near future; the simulation also predicts that many GC MSPs have radio fluxes  $S_{1400}$  above  $10 \mu\text{Jy}$  observable by future pointed radio observations.

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3:30pm

## 50 Years of beam Seminar Series

**Dr. Peter L.  
Gonthier**

Physics Department,  
Hope College  
Holland, Michigan

**Cyclotron Institute  
Room 228**

Refreshments will be served  
at 3:15pm