



Contribution ID: 726

Type: **Oral contribution**

Towards a Detection of the Geminga Supernova Remnant with VERITAS

Tuesday 4 August 2015 12:15 (15 minutes)

Geminga was first detected as a gamma-ray point source by the SAS-2 gamma-ray satellite observatory and the COS-B X-ray satellite observatory. Subsequent observations have identified Geminga as a heavily obscured radio-quiet pulsar associated with a nearby (250 pc) late Sedov phase (300,000 year) supernova remnant. The Geminga pulsar is the second brightest source detected by the Large Area Telescope aboard the Fermi gamma-ray satellite (Fermi-LAT) and has been frequently advanced as a source of the anomalous excess of cosmic ray positrons reported by PAMELA, Fermi-LAT, and AMS-2. It is surrounded by a compact X-ray pulsar wind nebula. Observations above 10 TeV by the water Cherenkov observatory MILAGRO have detected a diffuse gamma-ray halo around Geminga extending over several square degrees. The VERITAS IACT observatory has performed observations of Geminga and the surrounding halo region since 2007. However, the standard methods of source detection in VERITAS data have insufficient sensitivity to reveal a source on the scale of the Milagro detection. In this talk, we describe two approaches being developed to search for angularly extended VHE gamma-ray emission surrounding the Geminga pulsar.

Collaboration

VERITAS

Registration number following "ICRC2015-I"

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