



Contribution ID: 1141

Type: **Poster contribution**

## Gamma-ray halo around the M31 galaxy as seen by the Fermi LAT

*Tuesday, 4 August 2015 16:00 (1 hour)*

Theories of galaxy formation predict the existence of extended gas halo around spiral galaxies. If there are 10-100 nG magnetic fields at several ten kpc distances from the galaxies, extended galactic cosmic ray (CR) haloes could also exist. Galactic CRs could interact with the tenuous hot halo gas to produce observable  $\gamma$ -rays. In this paper we have performed search for such a halo around the M31 galaxy – the closest large spiral galaxy. Our analysis of 5.5 years of the Fermi LAT data revealed the presence of a spatially extended emission excess around M31. The data can be fitted using the simplest morphology of a uniformly bright circle. The best fit gave a  $4.4\sigma$  significance for a  $3^\circ$  (40 kpc) halo with photon flux of  $\sim (1.9 \pm 1.1) \times 10^{-9} \text{ cm}^{-2}\text{s}^{-1}$  and luminosity  $(8.4 \pm 4.6) \times 10^{38} \text{ erg s}^{-1}$  in the energy range 0.3–100 GeV. The presence of such a halo compellingly shows that a 10-100 nG magnetic field should extend around M31 up to a 40 kpc distance.

### Collaboration

– not specified –

### Registration number following "ICRC2015-I"

798

**Primary author:** PSHIRKOV, Maxim (SAI Moscow State University)**Co-authors:** Prof. POSTNOV, Konstantin (SAI Moscow State University); VASILIEV, Valery (MPIA Heidelberg)**Presenter:** PSHIRKOV, Maxim (SAI Moscow State University)**Session Classification:** Poster 3 GA**Track Classification:** GA-EX