Contribution ID: **39** Type: **Oral**

Gamma-ray Novae: Rare or Nearby?

Wednesday, December 7, 2016 3:55 PM (20 minutes)

Classical Novae were revealed as a surprise source of γ-rays in *Fermi* LAT observations. During the first 8 years since the LAT was launched, 6 novae in total have been detected to $> 5\sigma$ in γ-rays, in contrast to the 69 discovered optically in the same period. We attempt to resolve this discrepancy by assuming all novae are γ-ray emitters, and assigning peak one-day fluxes based on a flat distribution of the known emitters to a simulated population. To determine optical parameters, the spatial distribution and magnitudes of bulge and disc novae in M31 are scaled to the Milky Way, which we approximate as a disc with a 20 kpc radius and elliptical bulge with semi major axis 3 kpc and axis ratios 2:1 in the xy plane. We approximate Galactic reddening using a double exponential disc with vertical and radial scale heights of $r_d = 5$ kpc and $z_d = 0.2$ kpc, and demonstrate that even such a rudimentary model can easily reproduce the observed fraction of γ-ray novae, implying that these apparently rare sources are in fact nearby and not intrinsically rare. We conclude that classical novae with $m_R \leq 12$ and within ≈ 8 kpc are likely to be discovered in γ-rays using the *Fermi* LAT.

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Session Classification: Gamma-Ray Astronomy

Track Classification: HAP Workshop