AGN Populations for DC2

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Two Population Components

- **Known Sources:** 105 blazars identified from the Third EGRET catalog by Sowards-Emmerd, Romani, & Michelson (2004, 2005).
  - IDs established via dedicated OUV spectroscopic follow-up of radio surveys (NVSS, CLASS, GB6, PMN) for flat-spectrum sources:

  A “Figure-of-Merit” (FoM) was designed to find EGRET-like blazars. FoM combines radio, X-ray (RASS) and EGRET positional information to identify preferred counterparts for high latitude 3EG sources.
• **Population Synthesis:** Giommi (et al.) code was used.
  
  – Sample radio luminosity functions (e.g., Urry & Padovani 1995) separately for LBL, HBL, and FSRQs.
  
  – Assume no evolution for BL Lacs. Use pure luminosity evolution for FSRQs:
    \[
    L(z) = L(0)e^{2.2z/(1+z)}
    \]  

  – Standard SSC SEDs are used to extrapolate from radio flux to microwave, optical, X-ray, and \(\gamma\)-ray wavebands:
A duty cycle correction is applied to the $\gamma$-ray fluxes in order not to overproduce the extragalactic diffuse $\gamma$-ray background (Giommi et al. 2005):
- Validate population sampling against existing surveys, after applying relevant selection criteria, e.g., RASS:

For DC2, populations were generated assuming very weak X-ray and radio flux limits to avoid imposing selection effects on the $\gamma$-ray sample.
Generating the DC2 Sample

- logN-logS distributions “joined” for the two components. Transition between 3EG and Giommi populations at flux (> 20MeV) ≈ 3 × 10^{-8} photons cm^{-2}s^{-1} (Giommi distribution truncated above this flux.):

![Bl Lac + FSRQ sources](image-url)
- Redshift distributions:
Generating the DC2 Sample (continued)

- The 105 3EG blazars and 100 brightest Giommi blazars were randomly assigned light curves from Gino Tosti’s sample.

- Next 900 brightest Giommi blazars were combined into a single `SourcePopulation` object and modeled with simple power-laws. Photon indices were drawn from a Gaussian distribution centered at $\Gamma = 2.1$ and assuming a width $\sigma_\Gamma = 0.25$.

- The Python code that samples the Giommi distributions, assigns the light curves, and generates the xml and `SourcePopulation` data files is available on CVS: http://www-glast.stanford.edu/cgi-bin/viewcvs/users/jchiang/dc2_blazars/