

From: Steve Ritz [steven.m.ritz@nasa.gov]
Sent: Wednesday, February 23, 2005 00:21
To: JJ Russell (russell@SLAC.Stanford.EDU)
Cc: 'atwood@scipp.ucsc.edu'; 'Brian Winer'; 'Richard E. Hughes, Ohio State Physics'; 'David Wren'
Subject: FW: efficiencies for JJ

Importance: High

Hi JJ,

You are using an all_gamma sample 18 MeV - 180 GeV. To calculate your passing fraction, divide the sample into 4 logarithmic energy ranges (MC truth is fine here) as shown below and calculate the $A_{\text{eff}} \cdot \text{FOV}$ as follows:

$$\left[\frac{\text{\#surviving}}{\text{\#generated}/4} \right] \cdot 37.7 \text{ m}^2 \cdot \text{sr}$$

We generate events by throwing photons at a sphere with projected area of 6m^2 that has LAT embedded in it. We do this over 2π , hence 37.7. The events are logarithmic in energy, so you have equal numbers of generated events in each bin (hence the division by 4). It's important to use the actual number generated, not the number in the ROOT tree (which doesn't necessarily get written out when the photon completely misses the instrument and it certainly won't trigger!....).

If your filter has the following corresponding fraction surviving in the 4 energy bins:

18 MeV - 180 MeV : $>.26 \text{ m}^2 \text{sr}$
180 MeV - 1.8 GeV : $>1.56 \text{ m}^2 \text{sr}$
1.8 GeV - 18 GeV : $>2.6 \text{ m}^2 \text{sr}$
18 GeV - 180 GeV : $>3.1 \text{ m}^2 \text{sr}$

it's a pass!

We'll refine these later into smaller bins, and also add a separate test using well-reconstructed gammas in the final analysis. I want to stress that the above test is valid and useful because (a) looking at the raw sample independent of what we can do on the ground has merit (if we don't send the events to the ground, we can never do a better job on them) and (b) we have already looked at the embedded onboard filter in the offline environment for the raw and final gamma samples and have reasonable confidence there are not major problems lurking. Obviously we want to continue to improve the testing directly in the online environment.

I reviewed the numbers with Bill, and he'll also come by to talk with you on Thursday. In the meantime, please feel free to call with questions, comments, etc. Please let me know what kind of results you're seeing.

Best regards, Steve