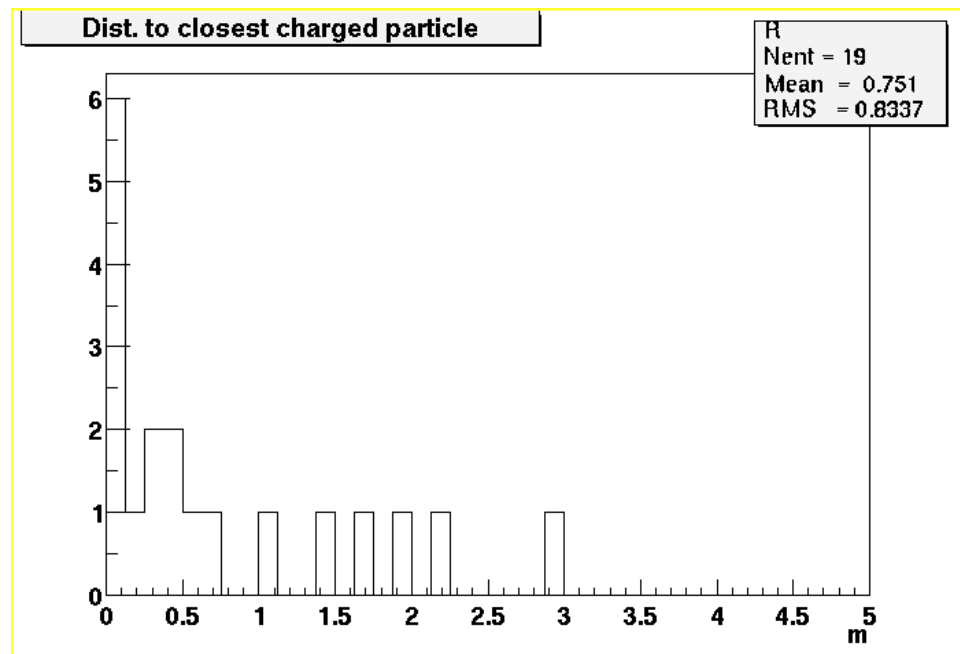


Pi0's from Air-Showers

- Used CORSIKA to generate simulations of particles at ground level from air-showers initiated by proton cosmic-rays. The simulations were thrown from 30 GeV – 100 TeV on an E-2.8 differential spectrum over a zenith angle range of 0-45 degrees.
- Look for pi0 decays where both gamma-rays reach the ground, have energy >1 GeV and are within 1 meter of each other.
 - rate is $1.4 \text{ hr}^{-1} \text{ m}^{-2}$
- This is an underestimate as it does not include helium primaries, and there will be additional contributions from larger zenith angles and lower energies.

Most of the time these pairs come accompanied by a charged particle (usually a pion).



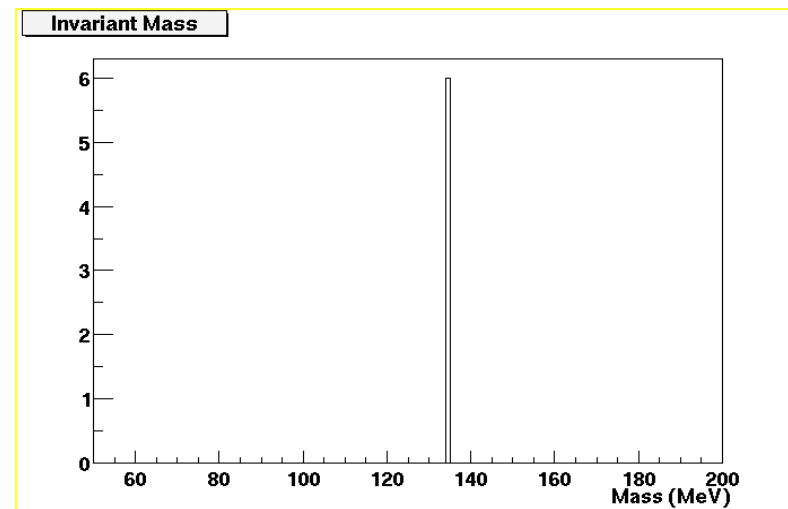
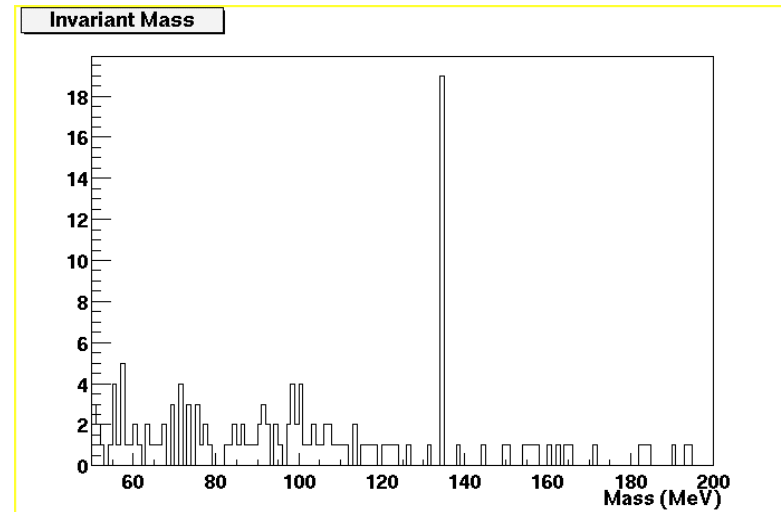
Invariant Mass Distributions

But even more of the background gamma-rays come accompanied by charged particles.

13.7 hours of data

Distribution of invariant mass for all pairs of gamma-rays which lie within 1m of each other.

Same as above, but added the requirement that the distance to the closest charged particle be $>1m$.



There are not quite enough simulation to make a good prediction about the rate of these events, but it certainly seems very promising that this is a measurement that GLAST could make.