• **Wednesday, 14 attendees**

• **Blasi, *Recent theoretical results on high-energy emission from galaxy clusters***
  
  – The intercluster medium acts as a cosmic-ray storage container, especially for protons
  
  – Clusters of galaxies form by mergers, and the cosmic rays in storage reflect the merger history
  
  – ‘Major mergers’ are the most energetic ‘events’ anywhere (10^{64} ergs in 10^9 yrs)
  
  – Still, simulations of merger buildup of clusters find that the shocks are not strong (except in case of very unequal masses) & indicate that clusters have soft gamma-ray spectra
  
  – Some clusters (and merging clusters) are likely to be LAT point sources
  
  – Conservatively, cluster mergers represent < 10% of the EGRB

\[ \eta = \frac{M_\gamma}{M_i} \]  

Gabici & Blasi (2002)
• Reimer, *Results from EGRET on gamma-ray emission of clusters*
  
  – Recently published studies have claimed associations of unidentified EGRET sources with galaxy clusters, or ‘possibly merging’ clusters, or ~3 σ statistical detection of high-energy γ-ray emission from an inhomogeneous population of 447 clusters
  
  – Reimer: Largest likelihood analysis yet of EGRET data using stacked, centered counts and exposure maps for 58 X-ray brightest, nearest clusters (and corresponding reprojected effective diffuse emission model) yields total exposure of $3.5 \times 10^{-10}$ cm$^2$ s, and upper limit of $\sim 6 \times 10^{-9}$ cm$^{-2}$ s$^{-1}$ >100 MeV
Digel, *Diffuse gamma-ray emission from external galaxies*

- ‘Normal’ taken to include starburst galaxies
- Summarized the limited literature on estimating fluxes of diffuse emission, and the even more limited list of EGRET detections
- Expected LAT detections are also limited, although LMC and SMC each ought to be resolved, and M31 have a good spectrum measured
- Nearest SBGs (M82, NGC 253) ought to be detected
- A recently published work on contribution of normal galaxies to EGRB is interesting, although it should not be the last word on the subject

Simulated >100 MeV map from LAT sky survey, based on LMC model by Sreekumar (priv. comm.) & including Galactic foreground and blazar background
• Pohl, *Interpretation of gamma-ray emission from SNR RX J1713.7-3946*
  – Recently detected as a TeV source
  – Together with radio continuum flux and ASCA X-ray spectrum, had been claimed that the TeV emission could not be IC, and was evidence of proton component of CRs
  – Counter evidence is that the associated EGRET point source has a spectrum inconsistent with this interpretation; synchrotron spectrum needs more data points

Reimer & Pohl (2002)
WG 1 + 2, Science Updates

- Thursday, 27 attendees for joint session WG 1 + WG 2
- Harding, *Pulsar searches in EGRET error boxes*
  - Parkes multibeam survey has detected 775 new radio pulsars, ~tripling # of pulsars known
  - 27 newly-discovered pulsars (this survey and Arecibo deep) are within EGRET error boxes
  - Distribution of pulsar properties (spin-down age, luminosities from new Cordes & Lazio dispersion measure model) shows many consistent with EGRET-detected pulsars
  - Retrospective pulsation searches are not feasible in the EGRET data, but population of candidates for monitoring during GLAST mission has been increased
  - Green Bank multibeam survey in the north is underway or soon will be
W G 1 + 2, Science Updates

- Grenier, *Sources and propagation of TeV electrons*
  - Work of R. Terrier on production of TeV electrons in SNR and detection by LAT
  - Cuts to distinguish proton showers from e-m showers
  - Strong anisotropy is expected for TeV electrons; Vela and Cygnus Loop are too young, leaving Loop I and Monogem as prospective sources

Terrier (2002)
WG 1 + 2, Interstellar emission model

- Hunter, *Considerations from GMULT & GBIAS maps from EGRET analysis*
  - Diffuse emission model local scale and offset factors for EGRET likelihood analysis
  - Anticorrelated, especially at high latitudes (and in GC region)
  - Lesson to be learned, once we figure it out; at least suggests that more orthogonal parameters could be used for LAT analysis

- Moskalenko, *GALPROP: Recent development and results*
  - Cosmic rays (including heavies), gas, interstellar radiation field, nuclear reactions, sources and propagation of cosmic rays (optionally 3-dimensional), calculation of gamma-ray fluxes
  - Showed preliminary new result for EGRB
  - Future work is anticipated on gas model & ISRF
WG 1 + 2, Interstellar emission model, cont.

- Grenier, *Interdisciplinary meeting for evaluating the gas and radiation distributions in the Milky Way*
  - We plan to invite (coerce) experts in radio (cm, mm, submm) surveys, IR (MAP?) data, stellar populations to a workshop in mid-2003, to make sure

- Coordinate representation for the interstellar emission model
  - Likely to be different from the one that is useful for generating the model
  - Avoid poles?
WG 1+2, Observation simulator modules

• Building blocks (in addition to the interstellar emission model)
  – Point sources of various kinds
    • Pulsars, plerions, binary pulsars, microquasars, starburst galaxies, galaxy clusters
    • We need flexible specification of spectra
    • A serious challenge is likely to be pulsars and binary pulsars: getting the timing right, allowing phase-dependent spectra,…[O2 will have to make arrival time corrections]
  – Small extended sources
    • Flexible specification of spectrum
    • Also flexible specification of distribution on the sky via ‘template’ maps

Orion A&B Molecular Cloud Complex
Dame et al. (2001)
115 GHz CO
Working Group 1 – Extended Sources and Diffuse Radiation

• Wednesday, October 23

1:45-4:00  Scientific updates – WG 1

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<thead>
<tr>
<th>Speaker</th>
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<th>Time</th>
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<tr>
<td>Blasi</td>
<td>Recent theoretical results on high-energy emission from galaxy clusters</td>
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• Thursday, October 24

8:45-9:45  Scientific updates – WG 1 + WG 2

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• Thursday, October 24

9:45-12:00  Science Tools Discussion WG 1 + WG 2

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<td>9:45</td>
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<td>Grenier: Interdisciplinary meeting for evaluating the gas and radiation distributions in the Milky Way</td>
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<td>All: Discussion of issues</td>
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<td>Break</td>
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<tr>
<td>11:25</td>
<td>Observation simulator modules</td>
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<td>11:30</td>
<td>All: Discussion of issues</td>
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