THE HISTORY OF COMPTEL

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How relaxing, these COMPTEL team-meetings!

I am sceptical that this is the best solution

I am afraid, this will be too expensive
The best parts of the UNH meetings are the lobster dinners.

Hm, that's really delicious.
I don't see any reason to be so happy

Building COMPTEL seems to be amusing
When you were up in space, did you get your per-diem every 90 minutes?
Continuum Sensitivity $\times E^2$

$[\text{MeV cm}^{-2} \text{s}^{-1}] \ T_{\text{obs}} = 10^6 \text{ s}, \Delta E = E$

Presently achieved continuum sensitivities
HIGHLIGHT RESULTS FROM
COMPTEL

— First-ever all-sky continuum maps in the
1 – 30 MeV range.
— All-sky source catalogue in the 1 to 30 MeV
range with 32 celestial objects.
— Detection of nucleosynthesis gamma-ray lines
  • all-sky map in the 1.809 MeV $^{26}$Al line
  • 1.156 MeV $^{44}$Ti line from Cas A and
    possibly from RX J 0852-4622
  • hints for $^{56}$Co lines from SN 1991T.
— Detailed study of the diffuse Galactic gamma-ray
  emission (spatial structure and energy spectrum).
— Observations of spectral breaks in the MeV range
  as characteristic of many gamma-ray blazers.
— Revision of the energy spectrum of the diffuse
  cosmic background (non-existence of the “MeV-
  bump”).
— Rapid localization of cosmic gamma-ray bursters.
— Observation of “long-duration” solar flares with 6
  to 8 hours lasting γ-ray and neutron emission.
— First map of an astronomical object (the Sun) in
  the light of energetic neutrons.
COMPTEL 1 to 30 MeV all-sky Map

The COMPTEL 1 to 30 MeV all-sky map in continuum gamma radiation represents the results of the first-ever survey of the sky at these energies. The concentration of the emission along the Galactic plane is the most striking aspect of the map. The plane stands out clearly against the rest of the sky indicating that most of the measured gamma-ray fluxes come from regions or objects inside the Galaxy. The dominant Galactic continuum emission seems to come from interstellar space, from cosmic-ray interactions, and is visible as diffuse Galactic radiation. Superimposed on the large-scale Galactic emission are point-like sources (like Crab, Vela, Cyg X-1), but many of the Galactic point sources remain unidentified at this time. A significant contribution of unresolved point sources to the apparently diffuse Galactic emission cannot be excluded. At medium and high Galactic latitudes, a few of the gamma-ray blazars, discovered by EGRET, are visible in the COMPTEL map, as well. Examples are 3C 273, 3C 279, and PKS 0528+134. The radio galaxy Cen A is also visible at MeV gamma rays. Some of the extragalactic objects detected by COMPTEL, are not visible in this map, because they flare-up only occasionally: on average they are too weak to be visible in this time-averaged all-sky map.
**TABLE 2. Summary of Most Significant COMPTEL Source Detections.**

<table>
<thead>
<tr>
<th>Type of Source</th>
<th>No. of Sources</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spin-Down Pulsars:</td>
<td>3</td>
<td>Crab, Vela, PSR B1509-58.</td>
</tr>
<tr>
<td>Supernova Remnants: (Continuum Emission)</td>
<td>1</td>
<td>Crab nebula.</td>
</tr>
<tr>
<td>Active Galactic Nuclei:</td>
<td>10</td>
<td>CTA 102, 3C 454.3, PKS 0528+135, PKS 0208-512, 3C 273, PKS 1222+216, 3C 279, Cen A, PKS 1622-297.</td>
</tr>
<tr>
<td>Unidentified Sources:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>•</td>
<td>b</td>
<td>&lt; 10°</td>
</tr>
<tr>
<td>•</td>
<td>b</td>
<td>&gt; 10°</td>
</tr>
<tr>
<td>Gamma-Ray Line Sources:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1.809 MeV (^{26}Al)</td>
<td>3</td>
<td>Cygnus region (extended), Vela region (extended, may include RX J0855-4621), Carina region.</td>
</tr>
<tr>
<td>• 1.157 MeV (^{44}Ti)</td>
<td>2</td>
<td>Cas A, RX J0852-4621 (GRO J0852-4642).</td>
</tr>
<tr>
<td>• 0.847 and 1.238 MeV (^{56}Co)</td>
<td>1</td>
<td>SN 1991T.</td>
</tr>
<tr>
<td>• 2.223 MeV (n-capture)</td>
<td>1</td>
<td>GRO J0317-853.</td>
</tr>
<tr>
<td>Gamma Ray Burst Sources:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(within COMPTEL field-of-view)</td>
<td>1</td>
<td>Location error radii vary from 0.34° to 2.70° (mean error radius: view 1.13°).</td>
</tr>
</tbody>
</table>
COMPTEL 1.809 MeV Survey
Spektrallinie des $^{26}$Al-Zerfalls, entlang unterschiedlicher Sichtlinien in unserer Galaxis (drei fächerförmige Bereiche wie im Bild rechts oben gezeigt). Die großräumige Rotation der Milchstraßenebene (breiter Pfeil rechts oben) führt zu Relativbewegungen von etwa 100 km s$^{-1}$ zwischen dem $^{26}$Al im interstellaren Gas und dem Sonnensystem. Dies äußert sich in Doppler-Verschiebungen der Linien (linke Spalte). Die gesamte Doppler-Verschiebung in Abhängigkeit von der galaktischen Längenkoordinate (rechts unten) lässt sich gut mit einem Rotationsmodell der Milchstraße beschreiben (farbig dargestellt).
Total number of refereed GRO publications from April 1991 to March 2016:

EGRET: 1173
BATSE: 1105
COMPTEL: 377
OSSE: 242
LS 5039: The COMPTEL MeV Source GRO J1823-12

COMPTEL 10 - 30 MeV

COMPTEL (Collmar et al., 2014)

Fermi/LAT (Hadasch et al. 2012)

SuZaku (Takahashi et al. 2009)

HESS (Aharonian et al. 2006)