Non-thermal SNR WG report

Cross-calibration using Crab


- Update collaboration team
- Observational picture in the soft & hard band
- Status of the absolute measurements of the Crab
- Energy range cuts
- Variability and time frame for the cross-calibration
- Spectral modeling of the Crab emission
- Preliminary results of spectral fitting
- Procedure, planning, agreed protocol and actions

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IACHEC Meeting, Grottaferrata 10-14 April 2011
Non-thermal SNR WG report

Update collaboration team (Instruments, CPs)

Soft-band (>10 keV)
Chandra/LETGS? (Weisskopf),
XMM/EPIC-pn (Guainazzi),
XMM/RGS (Kaastra?),
Suzaku/XIS (Ishida)

Intermediate band
JEM-X (Westergaard),
RXTE/PCA? (Jahoda),

Hard-band (> 10 keV)
Swift/BAT (Sakamoto),
INTEGRAL/IBIS (Natalucci),
INTEGRAL/SPI (Jourdain),
Suzaku/HXD-PIN (Terada),
Suzaku/GSO (Terada),
MAXI/GSC (Sugizaki),
Fermi/GBM (Case)
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Absolute Crab measurements at high energies
- Many balloon borne observations
- BATSE, COMPTEL & SPI: PL with break at \( \sim 100 \) keV
  A high energy component (\( > 700 \) keV) is seen by BATSE, not seen by SPI

Soft band measurements
- Chandra & XMM: results from mapping of the nebula
- Extraction of average spectra is difficult
- Shape is uncertain below \( \sim 2 \) keV due to absorption
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Variability and time frame of the cross-calibration

- Use of a common observation epoch
- 2007-2010 to maximize overlap among instruments
  (availability of data from EPIC-pn?)

Spectral modeling of the Crab emission

- Empirical models other than PL, for “smoothed” high energy break
- Power law of ln(E), additive correction factor? Etc.
- Use PL & co. models in varying bands to assess the need for correction
- Address the issue of modeling Crab pulsed & nebular emission separately
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Preliminary results of spectral fitting

4-instruments fit

Relative normalizations

0.87 (XMM)
0.97 (IBIS)
1.00 (SPI, fixed)
0.81 (BAT)

\( \Gamma_1 = 2.107 \pm 0.004 \)
\( \Gamma_2 = 2.27 \pm 0.02 \)
\( E_{br} = 97 \pm 6 \)
\( \text{Red.} \chi^2 = 1.60 \) (379 dof, syst=0.01)
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Procedure, planning

- Procedure, collecting data & information from the teams
- Contributions now stored on a local FTP site, will be put on the IACHEC Wiki

Actions

LN: circulate the protocol
LN. Finalize draft with current data (end April)
MW: Info about soft band processing incl. Absorption model
MI: Terada-san to send data of Suzaku & contact Sakamoto for BAT
RP: contact the RXTE team to verify their involvement in the project
GC: provide data & info for GBM