HETG - Status

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Ongoing HETG Team Activities Summary

• HETG Performance (Feb. 2007 - mid-May 2007)
  – 29 HETG obsids on 9 targets
    ✓ Our GTO: Crab(50ks), SN1987A(360ks)
    ✓ Deep exposures: TW Hydra and EX Hydra, 500ks each.
  – Monitoring HRMA FWHM: recent EX Hy observation added - OK.
  – HETG performance is nominal.

• HETG Calibration
  – Current/Future work:
    • More SNR E0102 for cross-calibration - assess new RGS model fluxes.
    • LETG-ACIS Capella observation (4/15/07) for precise LETG Rowland spacing.
    • HEG cross-dispersion asymmetry (initial work by Ishibashi)
    • Higher-orders' calibration
HRMA FWHM monitoring

Note: ACIS pixel randomization is ON for these points.
If turned off: ---> 34.5 um FWHM

EX Hy, recent data
Ongoing HETG Team Activities, cont.

- **Science Support to CXC, etc.**
  - *Chandra* Newsletter article.
  - X-ray Grating Spectroscopy Workshop
    - Many talks/posters from MIT/HETG people.
- **GTO Science Program**
  - Cycle 8 program: 2 done, 2 to go.
    - Crab and SNR 1987A - see next pages.
  - GTO Target selection for Cycle 9 - No conflicts.
    - Orion cont.(150ks); X1822-371 (150ks); NGC 1068 (400ks)
  - Postdoc status:
    - 3 PDs with finishing dates: 9/08, 3/09, 8/09.
    - Current contract covers them.
    - Desire FY10+ info by Spring-Summer '08.
Crab Pulsar -- Searching for an expanding shell

X-rays from pulsar pass through surrounding plasma.

The HETG spectrum (right) with model curve (solid) shows structure expected from the instrument (e.g., the feature at 23.3 Å) and a neutral oxygen (O I) feature of the ISM at 23.5 Å.

An imagined 1700 km/s expanding shell around the Crab would show absorption lines at 18.519 Å from O VII K-beta and at 18.857 Å from O VIII K-alpha (dotted lines.) These lines are not "jumping out" of this initial data analysis :-(( "Look and learn"
SN 1987A -- A detailed portrait at 20 years

• 20 years since SN explosion on Feb. 23 1987.
• Two complementary grating data sets:
  ✓ Spring'07: 370 ks w/HETG (GTO)
    – Fall'07: 300 ks w/LETG (McCray PI)
• 360.6 ks of data taken in from 11 March - 17 April
• Roll maintained in observation sets - great!
  – Roll 269.4820: 7 obsids for 160.7 ks
  – Roll 256.0784: 6 obsids for 163.8 ks
  – Roll 237.8017: 1 obsid for 36.1 ks
• Initial results Poster appearing at AAS in Honolulu at:
  *Endpoints and Interactions:*
  A Workshop On the Future of Supernova Remnant Research

HST optical images
Jan.'03 Dec.'05

~ 4 pixels!
Zeroth-order combined image from 360 ks
SN 1987A -- Very nice HETG spectra

MEG-plus
MEG-minus
HEG-plus
HEG-minus

HETG
The observed line shapes clearly show the Doppler signature of the moving, shocked ring material. In the plots below, emission from Ne X is well-fit with a ring velocity of 260 km/s. The fitting was carried out in isis using a custom 3d-geometric model.