Grid Fabrication and Characterization

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HESSI Imaging Spectroscopy
Tecomet Grid #3
Sun-side View

- Dark-side Fiducial Pinhole (1 of 3)
- Alignment Hole (1 of 2)
- Access Hole (1 of 2)
- Mounting Hole (1 of 3)
- TMS Pinhole (1 of 4)
- TMS Annulus (1 of 2)
- Sun-side Fiducial Pinhole (1 of 3)
Telemet Grid #3
Sun-side View

Dark-side Fiducial Pinhole (1 of 3)

Alignment Hole (1 of 2)

Access Hole (1 of 2)

Mounting Hole (1 of 3)

TMS Pinhole (1 of 4)

TMS Annulus (1 of 2)

Sun-side Fiducial Pinhole (1 of 3)
Mounts for Grids 1 - 4

Grid Rim

Fixed Mount (1 of 2)

Mount Adjustable in Twist
Grid #4 Kinematic Mounts
Coarse Grids #5 - 9
Stacking Coarser Grids
Optical Characterization Facility

- Top Table & Light Box
- Grid Alignment Fixture
- Grid
- Camera FOV (enlarged)
- Retroreflector
- Interferometer
- Laser
- PC Monitor

Motion paths:
- +Y Motion
- +X Motion
Grid #2

Pitch 59 mm
Slit width 41 mm
Thickness 2.04 mm
Material Tungsten
OGCF Results
X-Ray Grid Characterization Facility

Radioactive Sources Used

<table>
<thead>
<tr>
<th>Source</th>
<th>Energy (keV)</th>
<th>Strength on 5/19/1998 (mCi)</th>
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<tbody>
<tr>
<td>Cd$^{109}$</td>
<td>22</td>
<td>50</td>
</tr>
<tr>
<td>Co$^{57}$</td>
<td>122, 129</td>
<td>40</td>
</tr>
<tr>
<td>Cs$^{137}$</td>
<td>662</td>
<td>40</td>
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Grid #4 X-ray Angular Response
Grid #4 transmission as a function of angle to normal & energy.

Fractional Transmission

Angle (degrees)

+ Cd109
△ Co57
△ X Cs137
Definition of model fit parameters used to characterize the angular dependence of the grid transmission.
Slit/Pitch Ratio & Modulation Efficiency
Exercise 1

• Consider RHESSI grid 1:
  – 34 micron pitch
  – 25 micron apertures
  – 1 mm thick
  – separated by 1.55m
  – Grids 9 cm in diameter
  – Detector 6 cm in diameter

1. What is the FWHM resolution of RMC1 (assume 1\textsuperscript{st} harmonic only) ?

2. How much relative twist is required to totally destroy the modulation?

3. What would be the qualitative and quantitative effect of a relative twist of \( \frac{1}{2} \) of this amount ?
Spin axis at [246,-73]
Grid 8 slits were pointed at solar north at 18:58:08.5 UT and rotating at 15 rpm (clockwise looking at rear of collimator)
What is the source location?
Bonus questions: What is effect of a 1 arcminute error in the pointing?
   a 1 arcminute error in the aspect solution?
   a 1 arcminute error in the roll aspect?
Do a back projection image grid 8, 28-aug-2002 185750-185850 and compare to your estimate. Alternatively, use his_vis_fwdfit on the visibilities.