

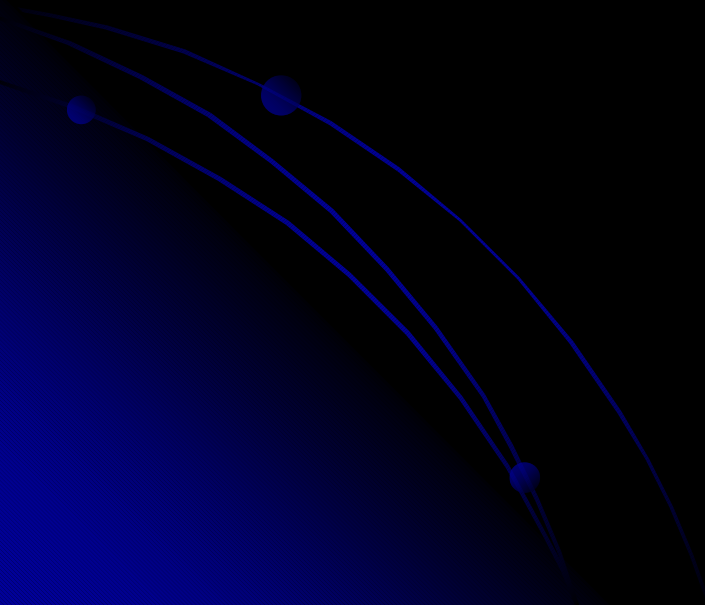
# The Hardware

*February 2004*

Martin C. Weisskopf

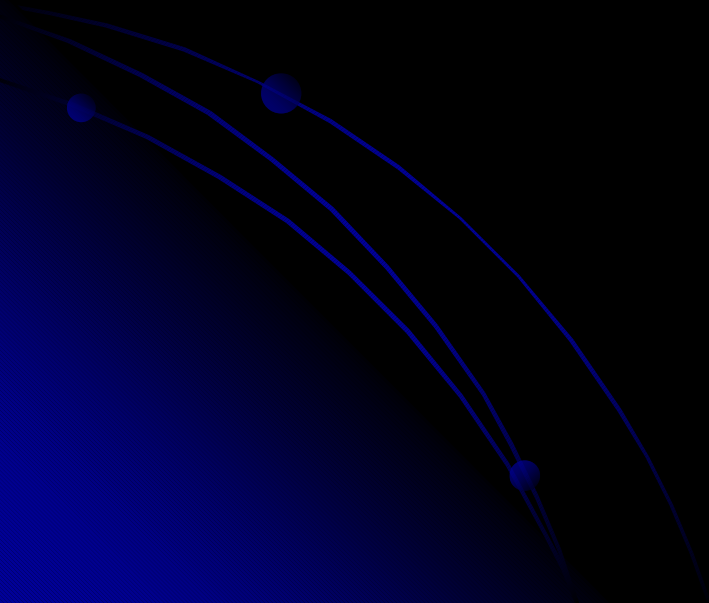
# An Explosion of Activity and Developments!

- Numerous new devices
- Many show great promise
  - Perhaps more than is warranted ☺



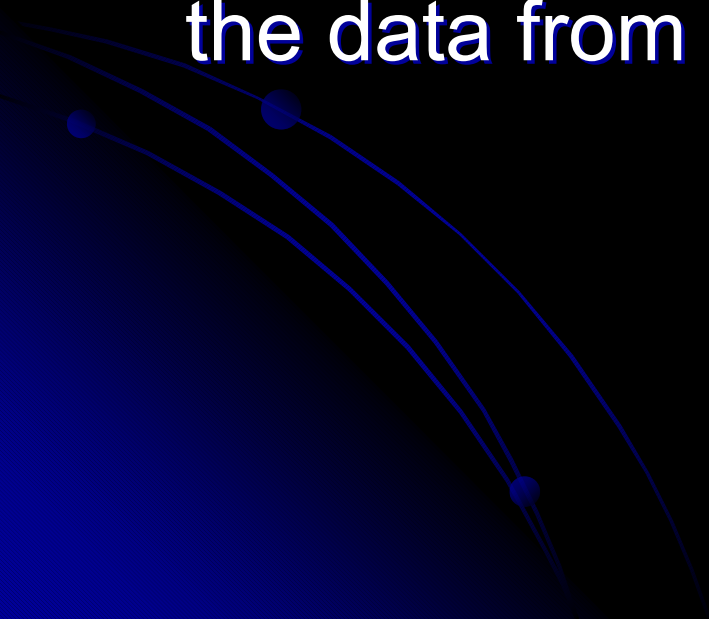
# Tools

- Particle Accelerators
- Simulation Tools



# Existing Devices

- RHESSI
- IBIS
- Although not designed for polarimetry there is much to be learned from exploiting the data from these instruments

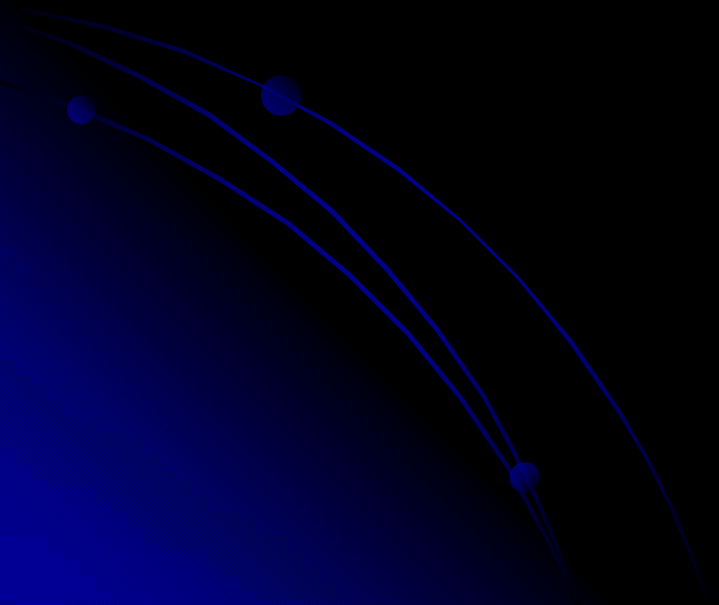


# X-Ray

- Thompson scattering
  - E.g. XPE, Spectrum-X SXRP/PRIZE
- Crystals
  - E.g. PLEXAS, SXRP/PRIZE
- Electron tracking
  - Work at Yamagata Univ, GSFC, Kyoto Univ (Mu-PIC), Riken (1DPSPC), and Italy

# Gamma-ray

- A number of different devices covering a wide energy range based on Compton scattering and detailed knowledge of the position of photon interactions

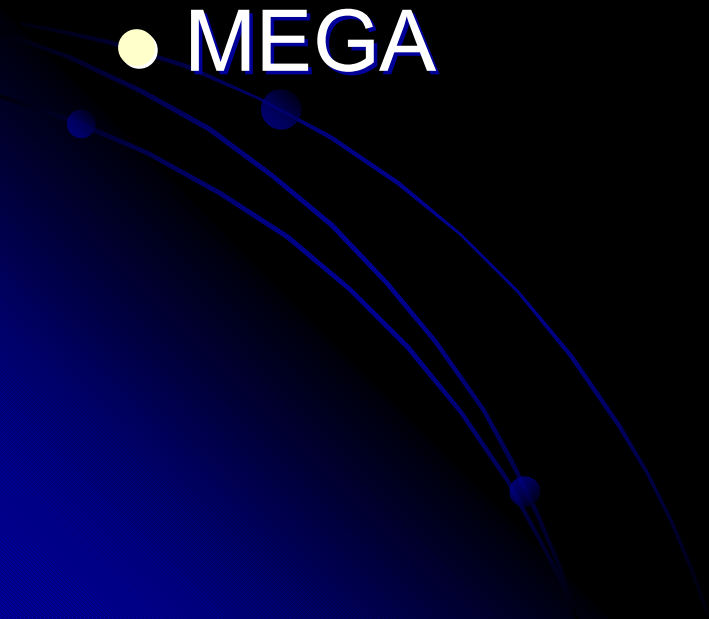


# Gamma Ray Polarimeters in the Compton Regime

- SGD
  - Si strips and pixellated CdTe
- Pogo
  - well-type phoswich
- NCT (0.2-10 MeV)
  - 12 cross-strip germanium detectors.
- GRAPE (50-300 keV)
  - Array of plastic scintillators plus calorimeter

# Gamma Ray Polarimeters in the Compton Regime

- Work at NRL
  - Thick (2mm) Si strips
- LXeGRIT
  - Liquid Xenon imaging of the interactions
- MEGA

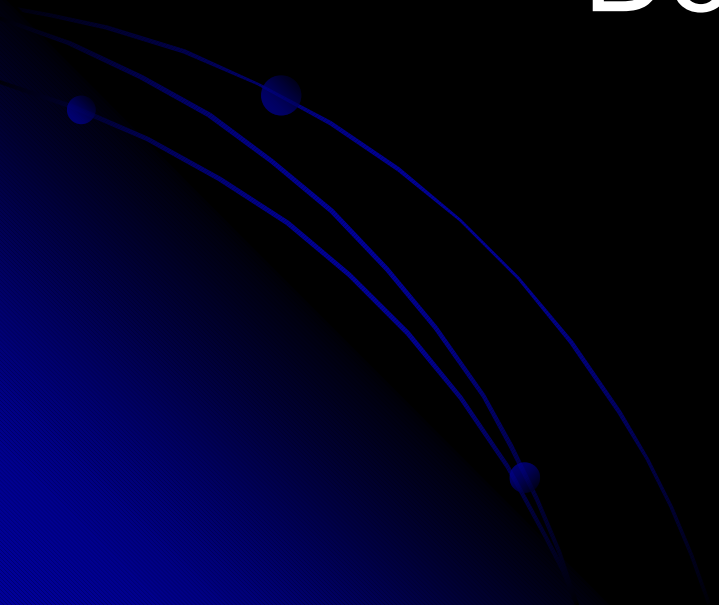




# Gamma-Ray Polarimeters in the Pair-Production Regime

- Going to be difficult

Don't Give Up!



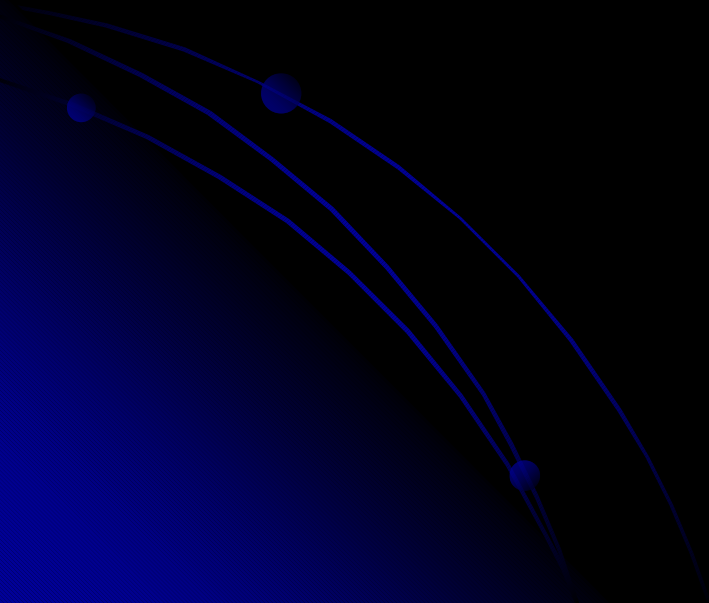
# Systematic Effects

- Critical design consideration
- Astrophysical Polarization may be/will be small
- Most instruments do not have large modulation factors

There is ***no*** substitute for detailed calibration of the full system with an ***unpolarized*** beam!!!

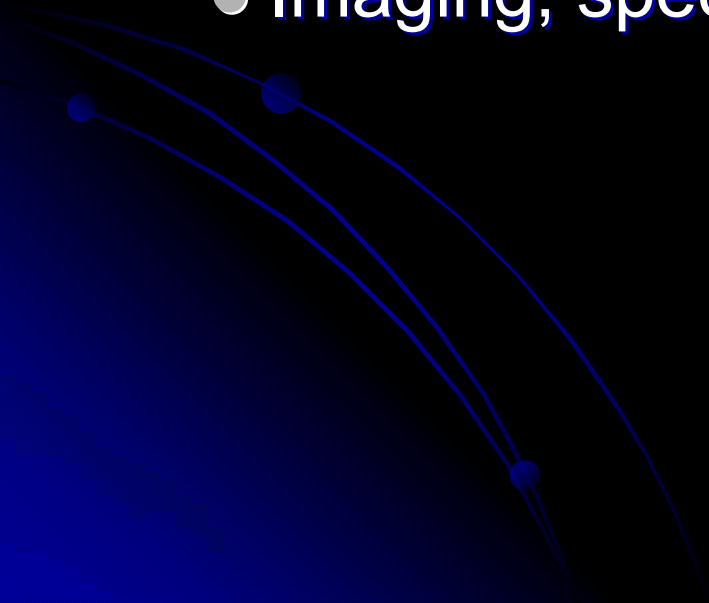
# Technical Concern

- There is a difference between determining that one has detected evidence for polarization (the MDP) and measuring that polarization.



# Perceptions

- Difficult for the instrument developers to keep up with the progress that surrounds them – especially in the X-ray band
  - Theory
  - Imaging, spectroscopy, imaging spectroscopy



# Perceptions

- Concerned about the impacts of the change of emphasis of the US space program
  - May have an impact on polarimetry in the X-Ray range (0.1 – 20 keV)
- Encouraged by the international interest
- Encouraged by the prospects for Gamma-Ray polarimetry in the Compton Regime
- Encouraged by this conference
- Need everyone's support
  - New strategic approach that unites the community

# Thanks!

- To Bob Novick
  - To the presenters
  - To the organizers
  - To the sponsors
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