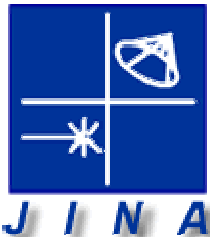
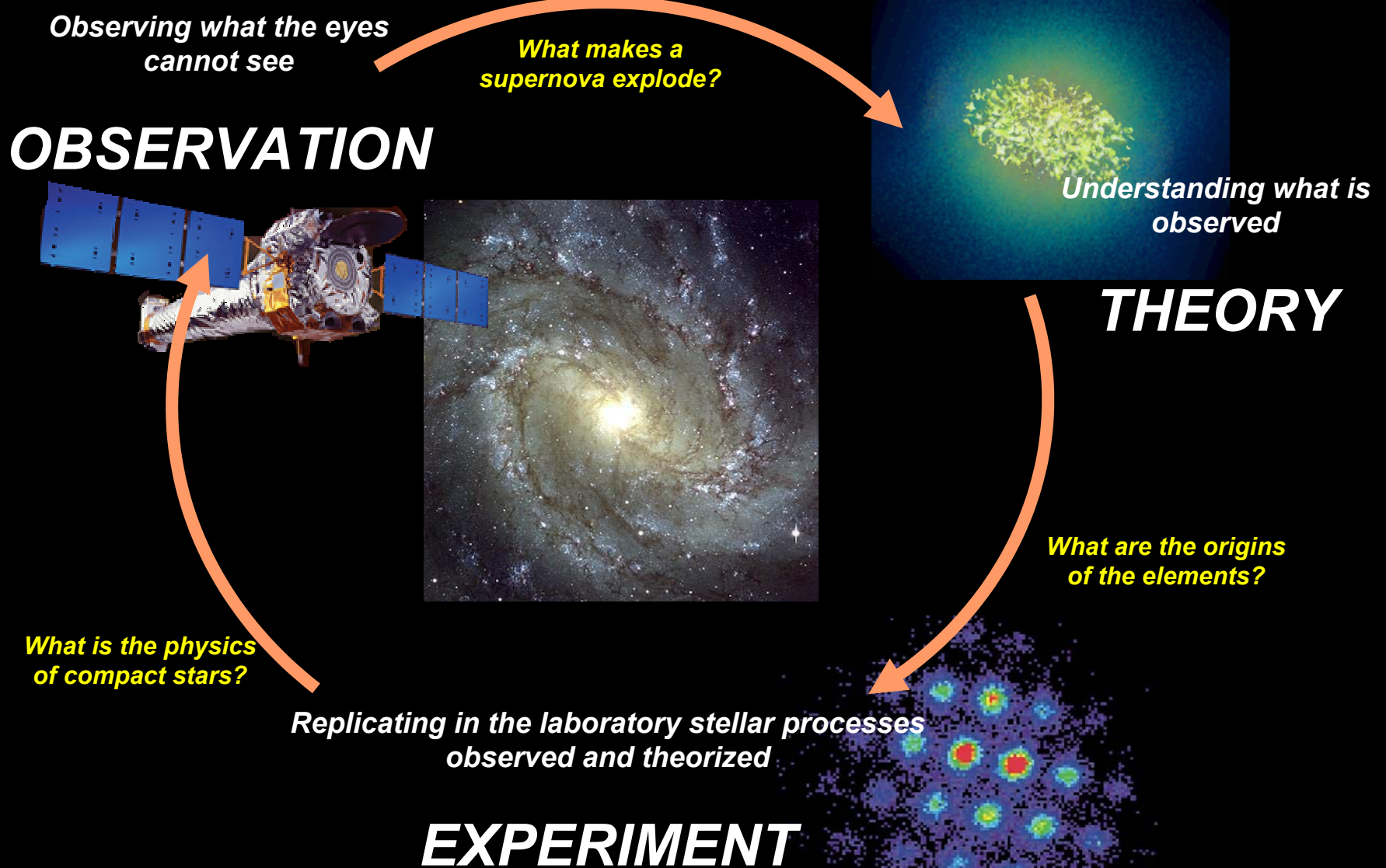


# The Big Picture

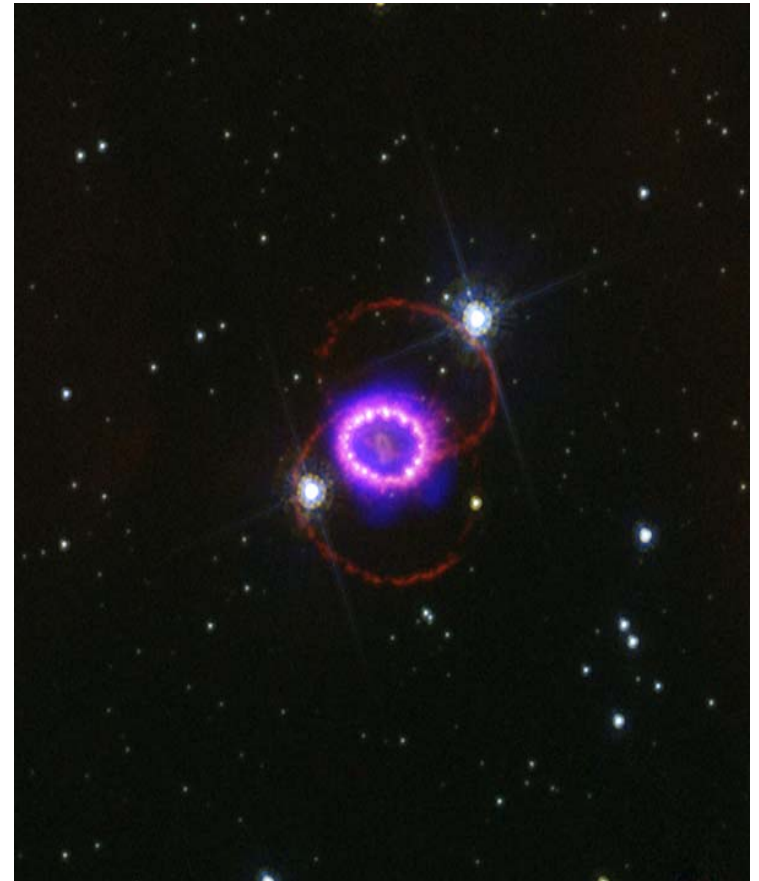
How the PIXE PAN Experiments  
relate to JINA Science





# PIXE and XRF

- Same Technique as used in XRAY Telescopes
- Used in conjunction with optical telescopes to study stellar events like supernova 1987a
- In this picture, pink/white is from Hubble, blue/purple is from Chandra X-Ray Observatory



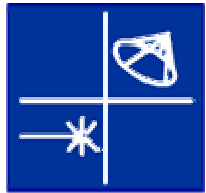
Credit: X-ray: NASA/CXC/PSU/S.Park & D.Burrows.; Optical: NASA/STScI/CfA/P.Challis

# PIXE and XRF

- Looking at X-Rays can also reveal unseen features like in spiral galaxy NGC 4258.



(Credit: X-ray: NASA/CXC/Univ. of Maryland/A.S. Wilson et al. Optical: Optical: Pal.Obs. DSS; IR: NASA/JPL-Caltech; VLA: NRAO/AUI/NSF)



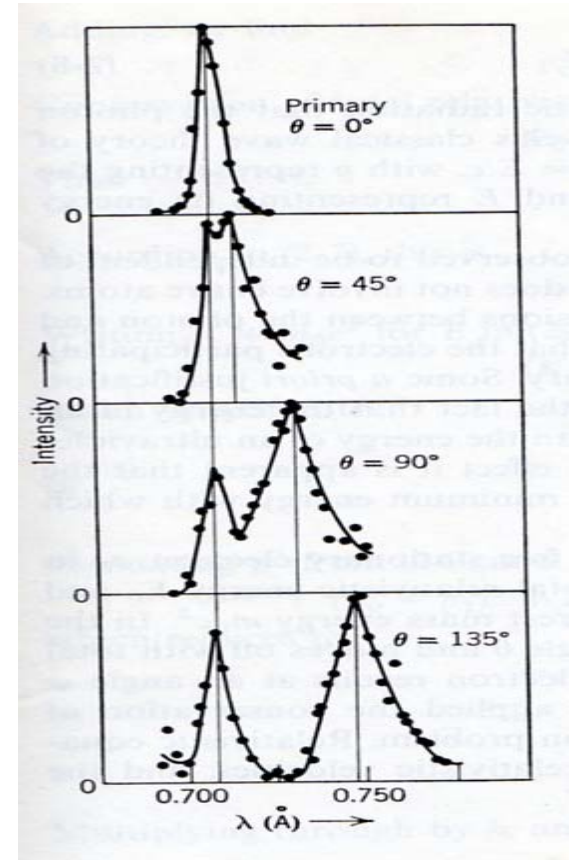
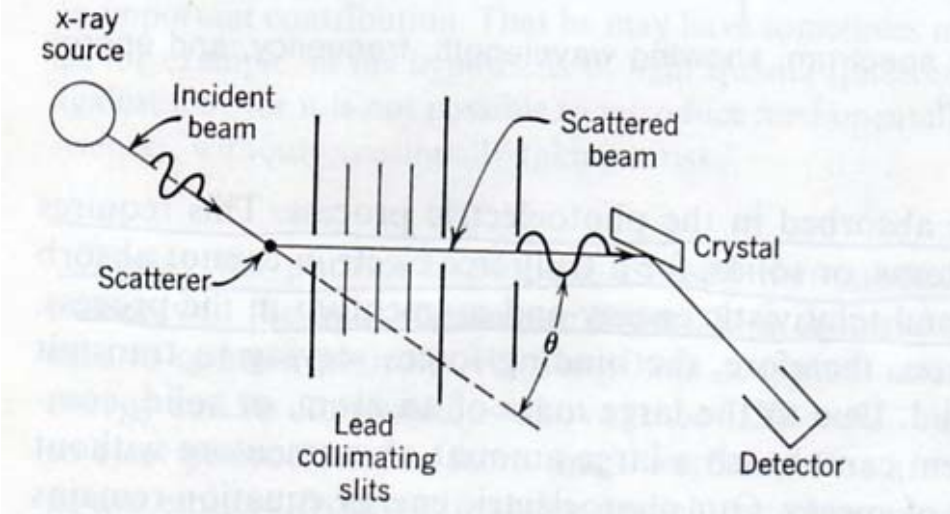
J I N A

*The Joint Institute for Nuclear Astrophysics*

[www.JINAweb.org](http://www.JINAweb.org)

# Compton Effect

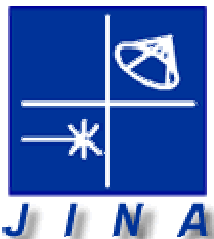
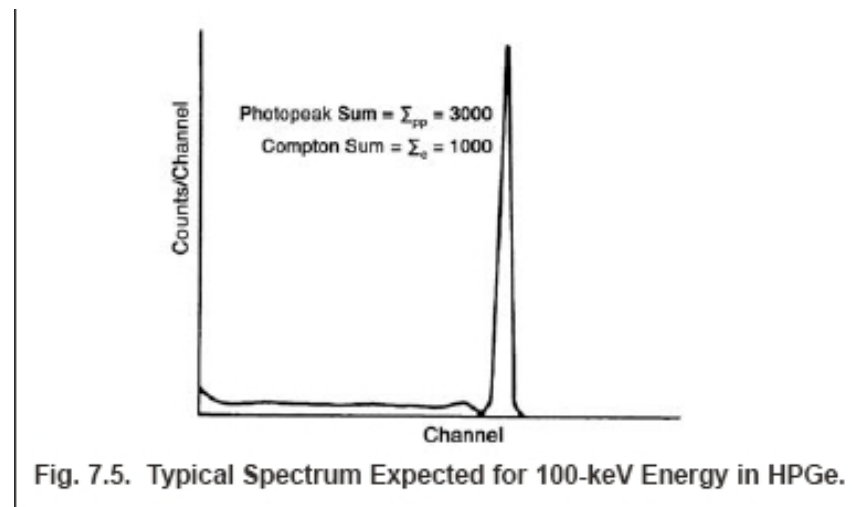
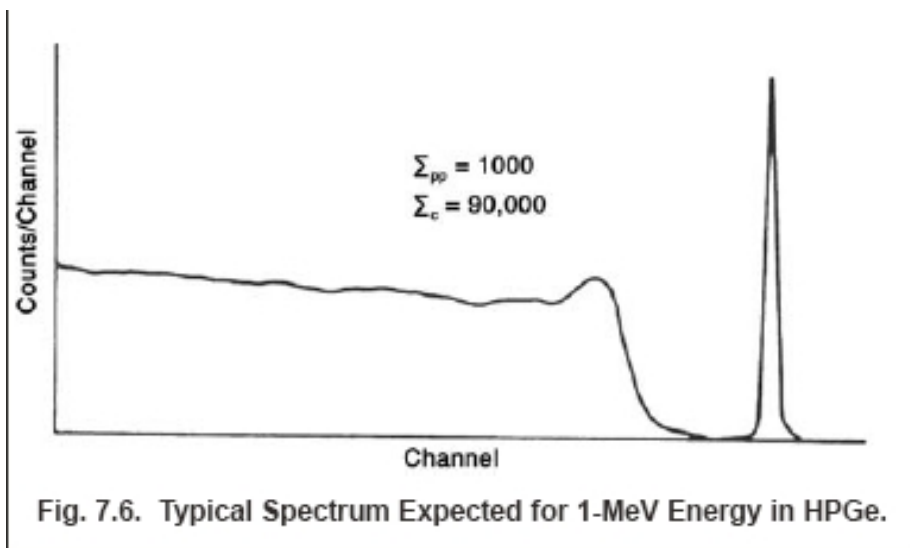
- In 1923 experiments by Compton helped confirm the particle like nature of light winning him the Nobel Prize in 1927.



Figures taken from Eisberg and Resnick's, *Quantum Physics of Atoms, Molecules, Solids, Nuclei, and Particles, Second Edition, 1985, p.34-35*

# The Compton effect in Gamma Detection.

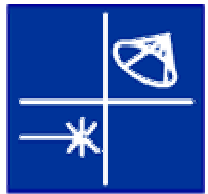
- The higher the energy of the incoming photon, the more you see the effects of Compton scattering.



Figures from Ortec Application Note 34,  
<http://www.ortec-online.com/application-notes/application-notes.htm>

# PIXE, XRF and Compton

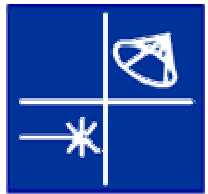
- All based on detecting the energy of photons which is one of the primary ways of detecting nuclear reactions in the lab.



J I N A

# e/m Measurement

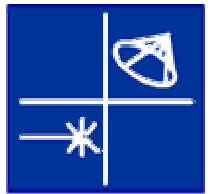
- Use the same principles used to operate the Accelerators used in the lab.
- Visually verify the impact of magnetic fields on a moving charged particle.





# Speed of Light

- Measuring very short times is extremely useful in measuring reactions.
- Same technique is used to help measure very difficult reactions using recoil separators.



# Future Project: RMS

