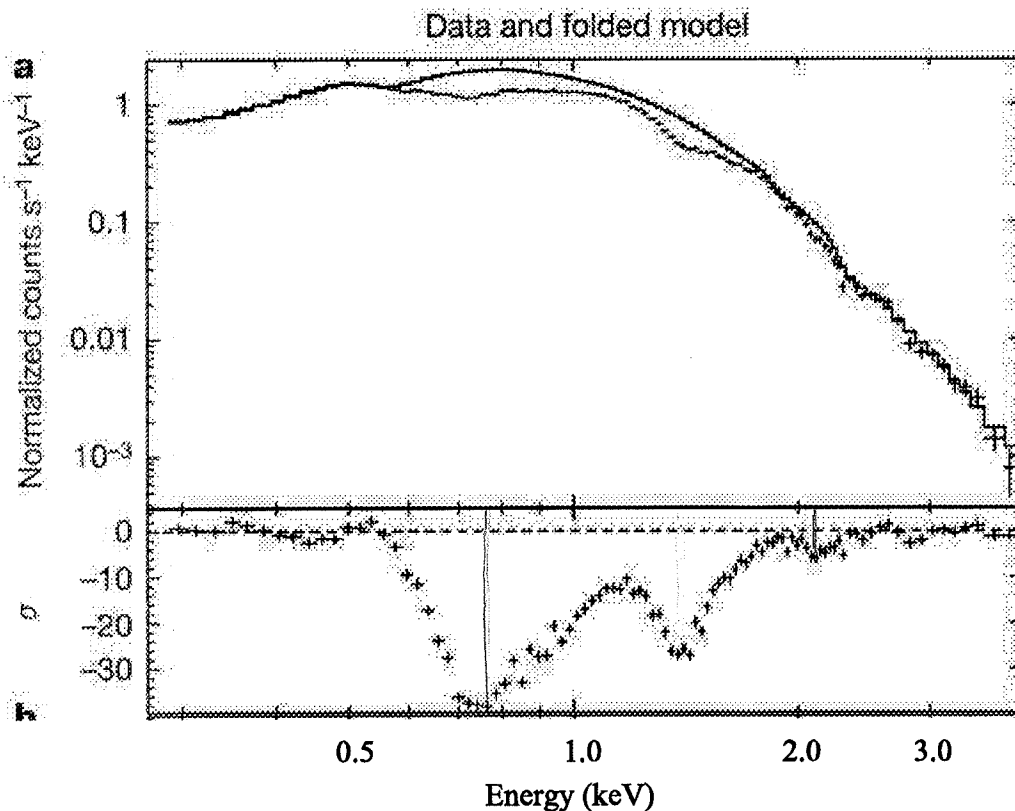


Largely?

PROBLEM 3

- a. An electron in an electromagnetic field will experience a Lorentz force. Write down the equation for the Lorentz force. (2 points).
- b. Consider an electron in a uniform magnetic field with a velocity v . What is the frequency of light emitted by this electron if the velocity vector is oriented perpendicular to the magnetic field lines? (2 points)
- c. The figure below shows the X-ray spectrum of an isolated neutron star. Direct your attention to the lower panel, which shows the difference between the spectrum and a blackbody continuum model. Three (possibly 4) absorption lines are seen. Please estimate the frequencies (in Hz) of these absorption lines. Which one is the fundamental frequency and which are harmonics? (2 points)
- d. Estimate the magnetic field strength, in gauss, of the neutron star, ignoring general relativistic effects. (2 points)
- e. Neutron stars are very compact, and general relativity should not be ignored. GR will affect the frequency of the absorption feature. Will the real feature have a higher frequency or lower frequency than estimated in part (d)? Explain. (2 points)



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Astro #3

a) $F = q(E + \frac{v}{c} \times B)$

b)