Lower limit on the heat capacity of the neutron star core

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Nuclear Lunch Discussion (Sep 27, 2017)

1. What is an accreting neutron star and why are they interesting observational objects? What is the motivation to put a lower limit on the heat capacity of a neutron star's core? Is it to study the birth and death of stars? **(Doug)**

2. How are the parameters core temperature, radius and mass measured for a neutron star? **(Sudhanva)**

3. How can we measure the luminosity entering into the core during the outburst? **(Tyler)**

4. What is an impurity parameter, $Q_{\rm imp}$? How does it affect the models in Fig. 1? Why only compare He and Fe envelope compositions instead of ^{12}C or ^{16}O? **(Matt)**

5. How does one calculate the exponents in equations (5) and (6)? Why are they different? **(Ibrahim)**

6. How do the authors plot heat capacity as a function of heat capacity? Why does the heat capacity increase with increasing neutron star mass as seen in Fig. 4? **(Cole)**

7. What is URCA cooling and how does it differ from Modified URCA ? **(Kristyn)**

8. What is a color-flavor-locked phase (CFL)? Why is the specific heat contribution of the CFL phase smaller than the electronic contribution? **(Joey)**

9. What do the unpaired nucleons and the leptons only regions in Fig. 7 refer to? Why is their contribution to the heat capacity different? **(Gulakshan)**

10. What is superfluidity and what can we infer from superfluidity in a neutron star? What is a pairing gap model ? **(Abinash)**

11. Is it possible to have a negative accretion due to neutrino loss? If not, why? **(Robert)**

12. What is the difference between the outbursts in the paper and X-Ray Bursts? **(Shiv)**

13. There are different types of temperatures in Astronomy such as the color temperature, statistical temperature, etc. What temperature was used in this paper and why? **(Taya)**