Polaris Research Project – Week 1

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This week you'll get started by learning about the basics of neutrinos. You'll start with a few videos about neutrino physics and supernovae (SNae). Work on these items this week and try to have them done by our project meeting next week (2/21).

Please take some notes during/after watching these videos about what you found interesting, what you have further questions about, and what you didn't really understand.

Start with the following videos:

- What is a Neutrino?
- What Are Neutrinos? | How The Universe Works
- Neutrin...WHOA A SUPERNOVA! | Even Bananas 05

In addition to taking notes, try to answer the following questions from the above videos:

1. Why is Cherenkov Radiation like a sonic boom?
2. What is the flux of solar neutrinos at the Earth? In other words, how many neutrinos from the Sun get to you, per cm^2 per second?
3. How do we know that neutrinos must have mass?
4. What percent of a SN's energy is given off as light?
5. Neutrinos travel slower than light. From a SN, why do we detect neutrinos before photons?
6. How many neutrinos were detected from SN1987A?

Finally, watch the first 8 minutes of Fermilab's Neutrino University Lecture on Supernova Neutrinos.