

SEMINAR IN PHYSICS

Friday, February 22, 2019
3:30-4:25 – Ross 0220

~ Refreshments ~

Fusion in Main Sequence Stars

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Most of a star's life is spent in the Main sequence phase. During this phase a star's core can undergo one of two types of nuclear reactions, the Proton-Proton chain or the CNO cycle. Thanks to the experiments and results produced by the Laboratory for Underground Nuclear Astrophysics or LUNA we now have a better understanding of these two types of reactions. The P-P chain is dominant in lower mass stars such as the sun while the CNO cycle is more common in stars of high mass.

The most important feature about these two reactions is that they both produce Helium 4 as well as energy. These reactions are very different despite producing very similar results.

Rotational Mechanics of Water Bottle Flipping

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The recent trend of water bottle flipping can offer key insights into rotational mechanics with unique applications for physics education. Specifically, this is a demonstration of conservation of angular momentum. Three different scenarios were used to study this phenomenon. The motion of the flipped bottles was tracked using a digital camera and then analyzed to measure position versus time. This data was then used to calculate angular velocity as a function of time. The decrease in angular velocity over time demonstrates that the moment of inertia increases throughout the motion. Creating a model for the data allowed for a rough estimate for an optimal filling fraction of the water bottle.

This has practical applications to physics education because it is a simple experiment requiring little technology and already has some familiarity and public interest due to the viral nature of the topic.