Outline for Technote

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- b. Literature Review Information + Motivation
- c. Calculations of Charge State Abundances
 - i. Skynet and Saha equation
 - ii. Temperature Evolution Models
 - iii. Functions and Logic
 - iv. Graphics
- d. Studies on Abundance vs Ye
 - i. Functions and Logic
 - ii. Graphics
- e. Ye cutoff and Skynet Parameter analysis
 - i. Functions and Logic
 - ii. Graphics

B. Introduction

- a. Background
 - i. Neutron Stars, nucleosynthesis, r-process
 - ii. Supernovae and merger conditions
 - iii. Atomic Physics
- b. Description of goals

C. Literature Review

- a. Literature review notes
- b. Literature review proof of needing atomic physics knowledge
- c. Motivation description

D. Charge State abundances

- a. Skynet and Saha equation
 - i. What Skynet is and how we treat it like a blackbox
 - ii. How we use Skynet data

- iii. What is the Saha equation and contribution to charge state abundance calculations
- iv. Atomic physics relevance
- b. Temperature Evolution Models
 - i. Power law model
 - ii. Non-adiabatic photon gas model
 - iii. Photon gas + baryon component model
- c. Functions and Logic
 - i. Ionization Generator
 - ii. Temperature model implementation
 - iii. Elemental and charge state abundance calculation
 - iv. Explanations of functions purpose and pseudocode
- d. Graphics
 - i. Plotting functions
 - ii. Significance
 - iii. Critical details

E. Studies on Abundance vs Ye

- a. Functions and Logic
 - i. Elemental and Charge State abundances and Mass Fractions
 - ii. Explanations of functions purpose and pseudocode
- b. Graphics
 - i. Abundance vs Ye plot
 - ii. Critical Ye values

F. Ye Cutoff and Skynet Parameters

- a. Functions
 - i. Altering skynet values for Ye, heating rate, and entropy
 - ii. 3D space of parameters and Ye cutoff
- b. Logic
 - i. Purpose of Ye cutoff
- c. Graphics

G. Atomic Models

- a. Unique atomic models
 - i. Kasen
 - ii. Tanaka
 - iii. Metzger
- b. Models' effects on abundance calculations

H. Connections to Other Papers

- a. Compare data to other people's work
- I. Conclusion
- J. References