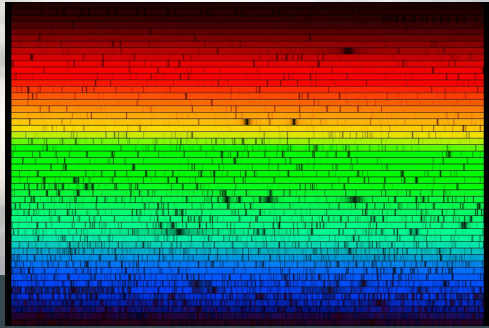


Forensic Astronomy: Collecting Chemical Fingerprints of Ancient Supernova Explosions

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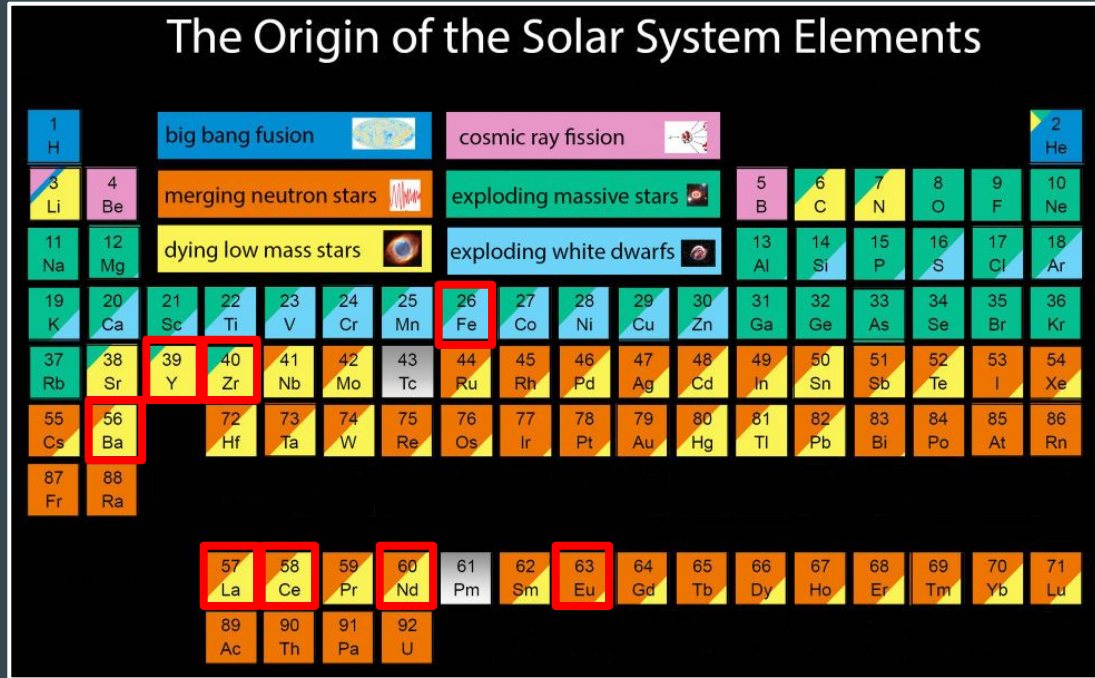
The Subaru Telescope



- Data collected from the Subaru Telescope atop Mauna Kea in Hawai'i using the High Dispersion Spectrograph to obtain spectra of the population of stars.
- For our study we are using stars in star clusters as they allow us to also determine the ages of the stars, independent of their chemical makeup.

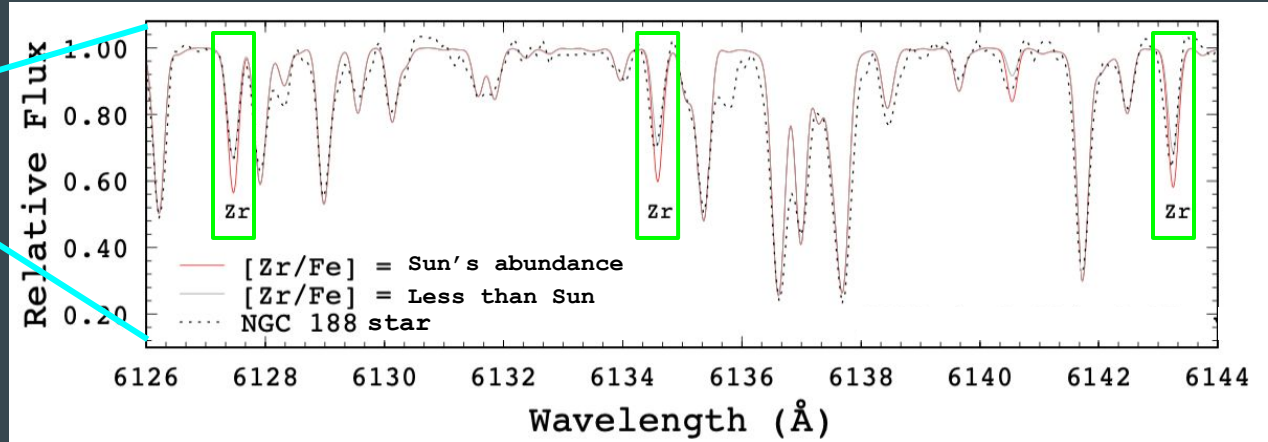
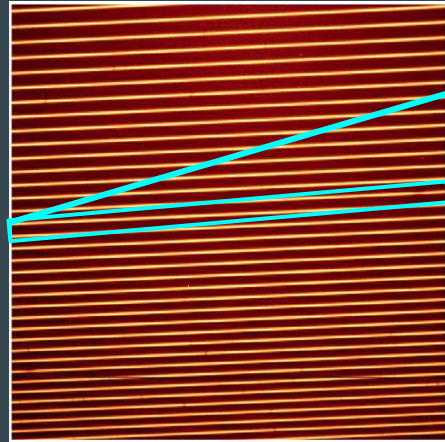
Chemical Enrichment - What is it?

- After the Big Bang, the universe was only comprised of Hydrogen and Helium.
- As stars age, they create the elements more complex than Helium.
- When stars die, they expel the elements they created back into the galaxy, causing the next generation of stars to start with heavier elements.

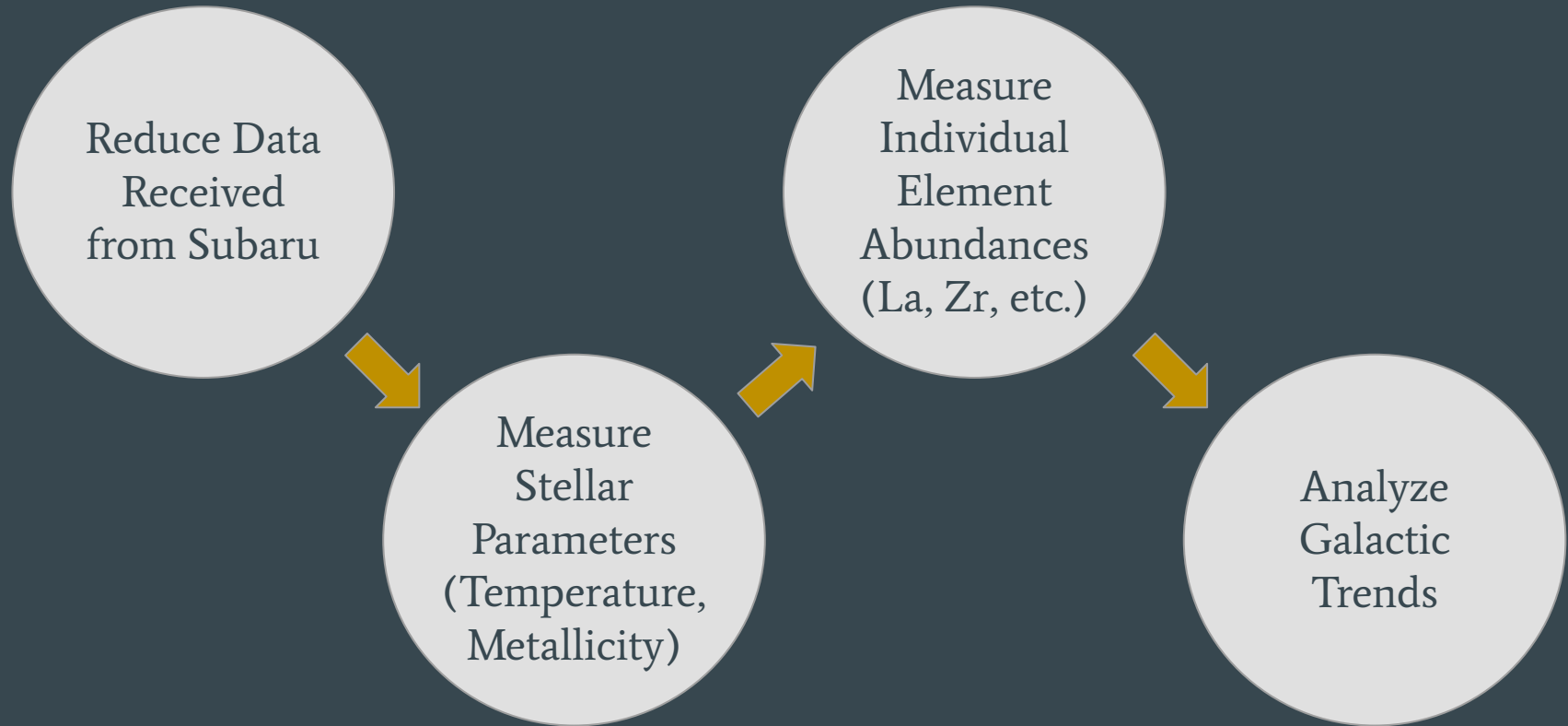


Spectroscopy Methodology

- Spectra allow us to examine absorption lines due to elements in the star's atmosphere.
- This leads us to relative abundances for a series of elements.

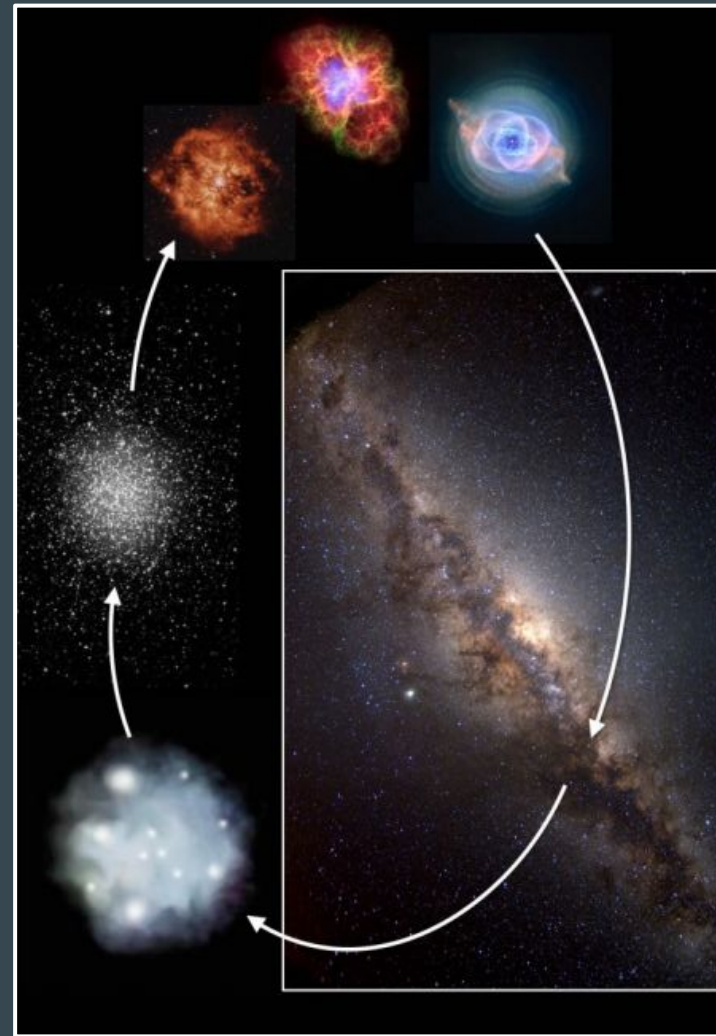


Moving Forward...



Galactic Chemical Evolution

- Elements are built up over multiple generations of stars.
- By analyzing stars in star clusters, this allows us to age-date the stars.
- By using star clusters of different ages, we can sample the elements through the history of the Milky Way.



Questions &



After the Big Bang, the Universe was comprised solely of hydrogen and helium. During a star's lifetime, it creates heavier and heavier elements. When a star dies, it can create even heavier elements, such as zirconium and lanthanum, and disperses them into the Galaxy, which is called Chemical Enrichment. This cycle repeats itself, until we are left with a new generations of heavy element, or metal-rich, stars. Using observations from the Subaru Telescope in Hawai'i, we measure the elements in star clusters, that have known ages, to determine how and when heavy elements were built up in the Milky Way.