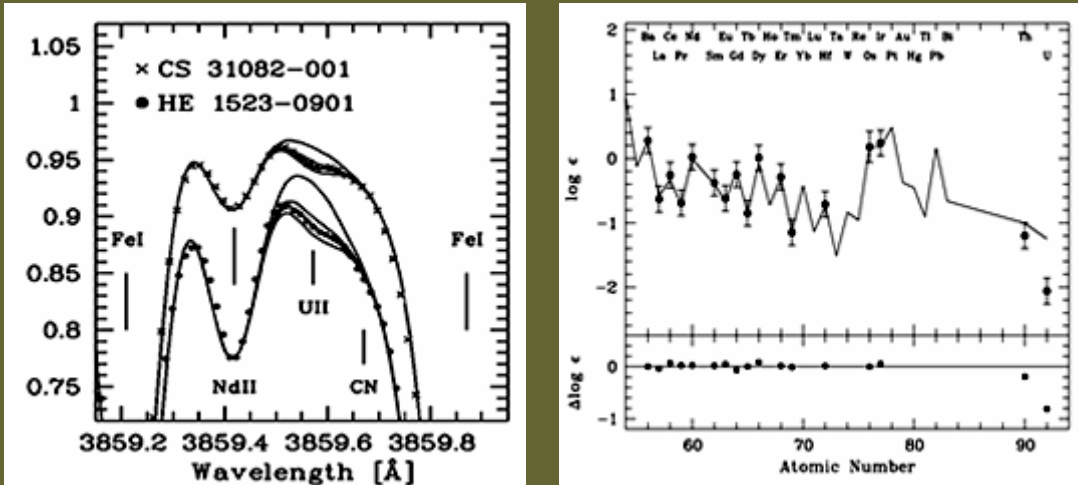


A New r-process-Enhanced Metal-Poor Star with Measured Uranium



Frequent JINA visitor Anna Frebel, in collaboration with JINA co-PI Beers, have discovered the second highly r-process-enhanced metal-poor star with detectable amounts of Uranium. In the upper left panel, the region of the spectrum around the Uranium feature is shown, along with lines representing synthesis fits with differing amounts of this element. In the upper right panel, the measurements of other elements are shown to track extremely well the scaled solar r-process pattern, with the exception of the Uranium and Thorium, which have decayed away over the many billions of years since their creation.

The presence of Uranium and Thorium (long-lived radioactive elements) enable the determination of a reasonably accurate lower limit on the age of the Universe, of 13.2 billion years. The star, HE 1523-0901, has a metallicity $[Fe/H] = -2.95$, similar to the handful of other stars in which large enhancements of r-process elements have been found. This star is of special importance since it is significantly brighter than all other such objects, with a V magnitude of 11.1. Its brightness will enable detailed measurements of other elements of interest, such as lead, with the (hopefully) soon-to-be-repaired STIS spectrograph on the Hubble Space Telescope.

Reference:

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