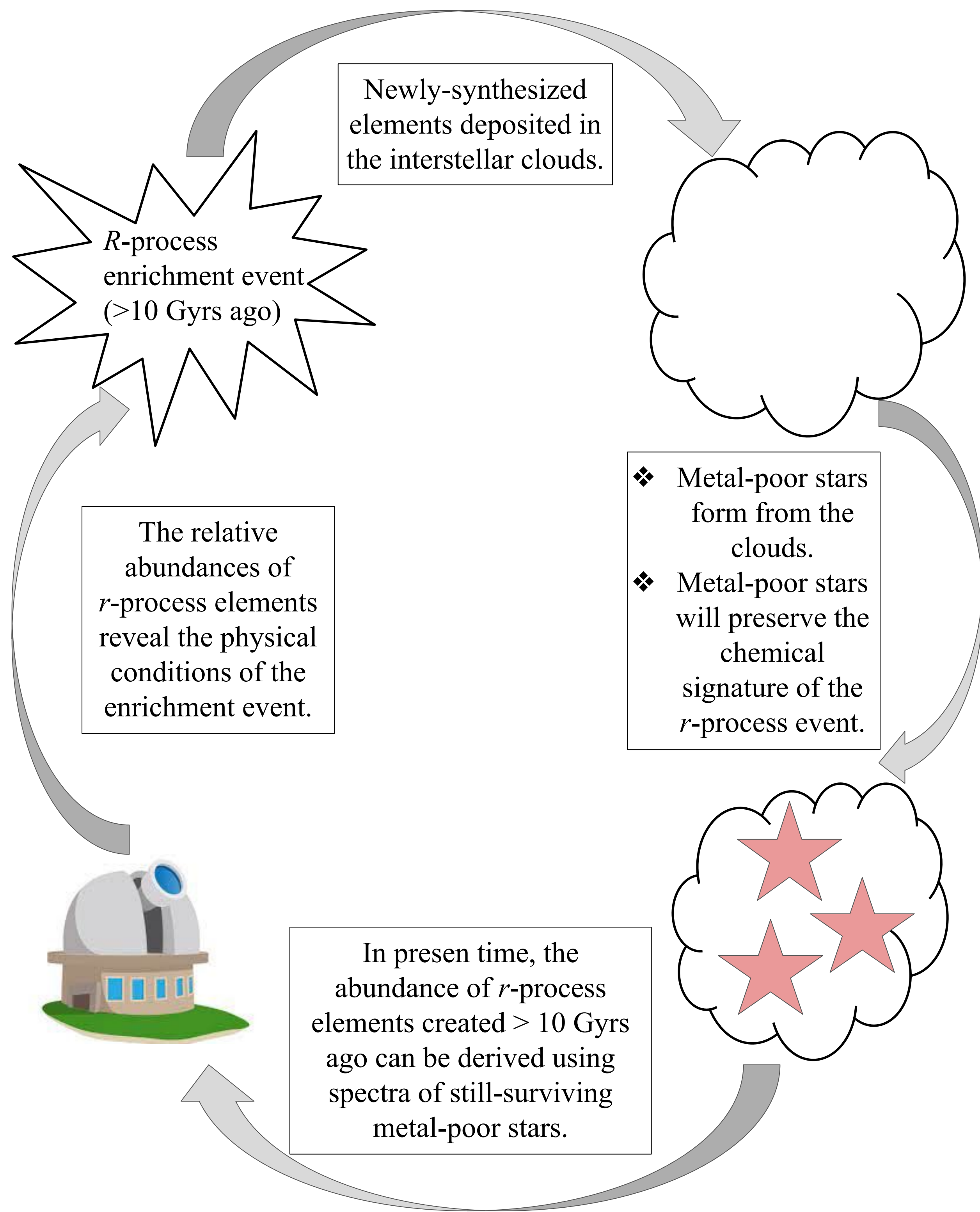


Actinide Abundances Using New Uranium Lines

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Timothy Beers^{2,6}, Rebecca Surman^{2,6}, Erika Holmbeck

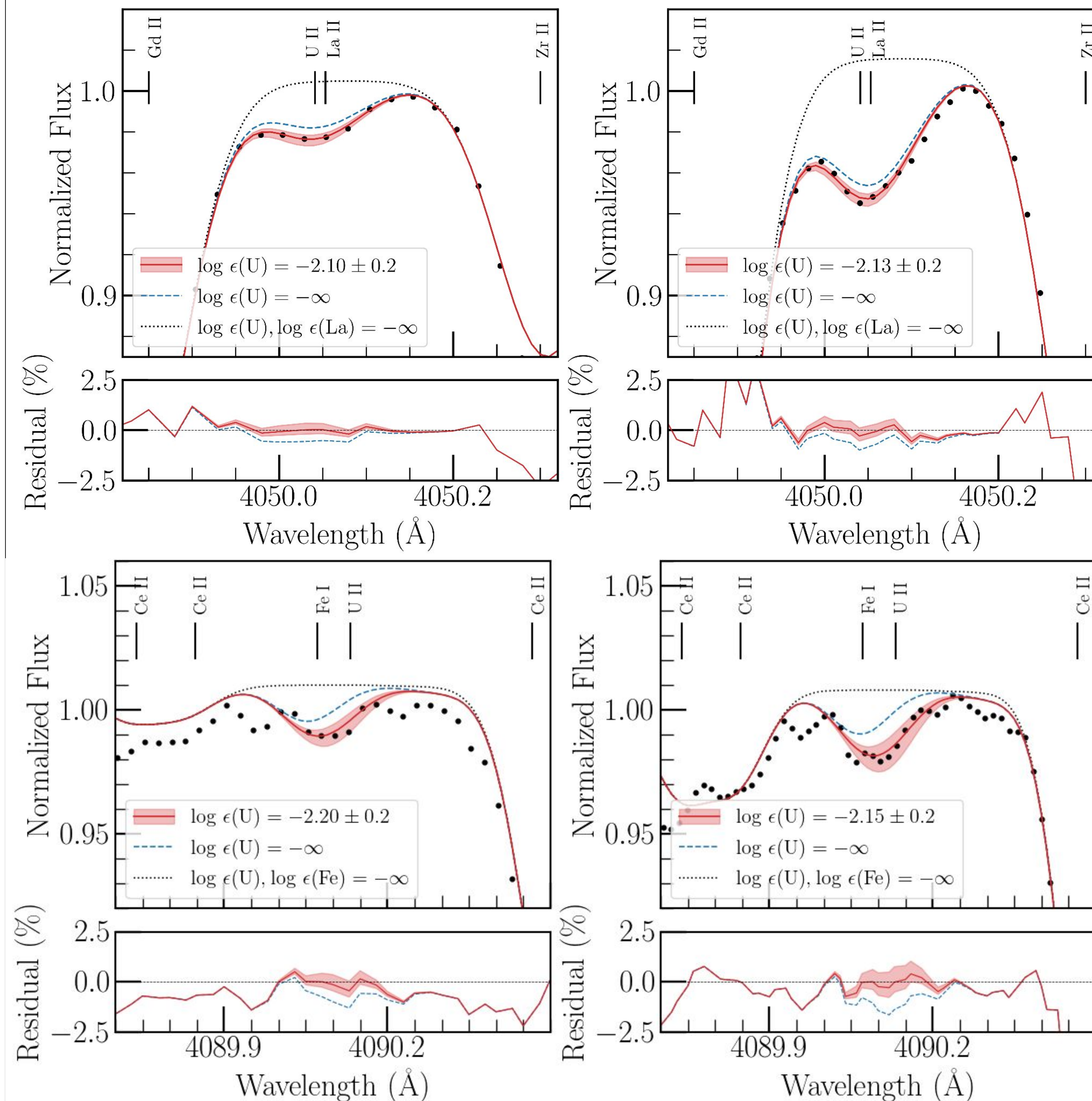
1. University of Florida, 2. JINA-CEE, 3. University of Chicago, 4. Stockholm University, 5. Pontificia Universidad Catolica de Chile,
6. University of Notre Dame, 7. Carnegie Observatories



Uranium: An important *r*-process element, but difficult to detect!

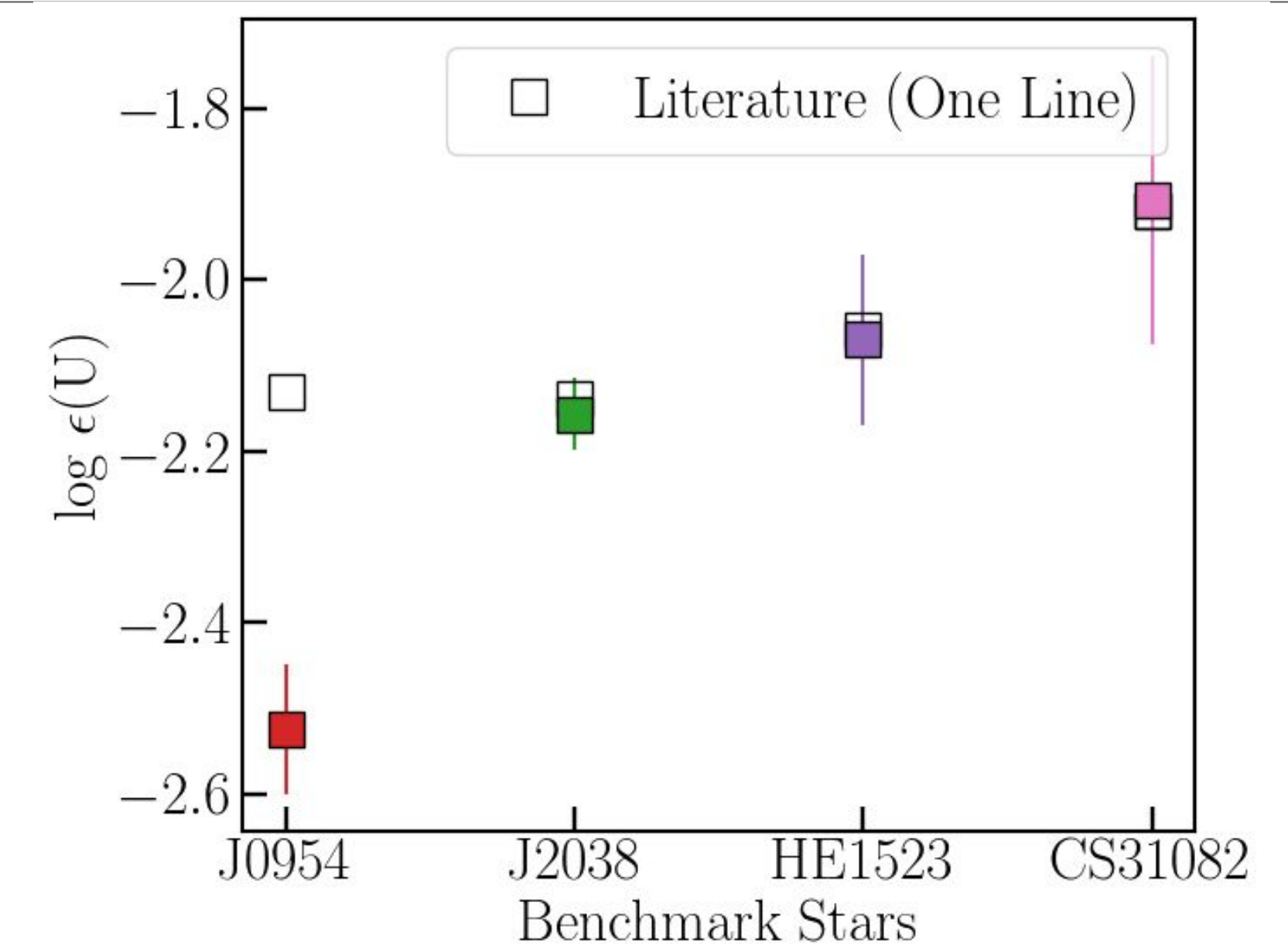
- ❖ Uranium (U) is the heaviest stable element produced in the universe and belongs to the actinide group of elements.
- ❖ Its abundance is sensitive to the physical conditions of the enrichment event.
- ❖ Additionally, U is radioactive offering the opportunity to estimate the age of the enrichment event.
- ❖ However, of the ~100 *r*-process enhanced stars discovered so far, U has been detected in only ~6.
 - ❖ The canonical absorption line used is heavily blended.

We derive uranium abundance for 4 benchmark *r*-process enhanced stars using absorption lines at 4050.04 Å (top) and 4090.31 Å (bottom).

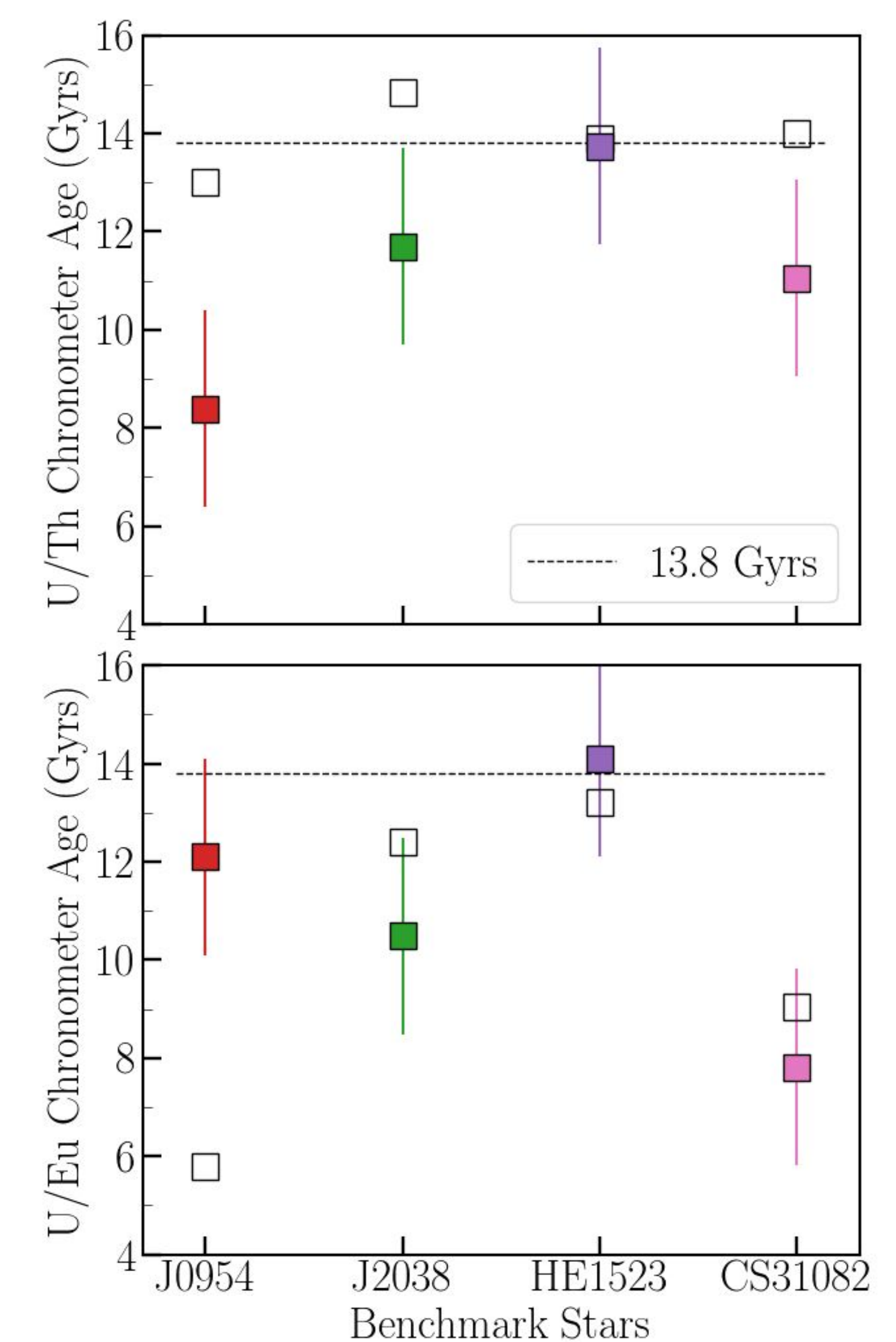


Sample Stars: J0954, J2038, HE1523, CS31082
Instrument: Keck/HIRES, MIKE/Magellan, UVES/VLT, UVES/VLT
Resolving Power: > 60,000
Signal-to-Noise Ratio: > 150

Radiative transfer code: MOOG (Sneden) (<https://github.com/alexji/moog17scat>)
Model Atmosphere: 1D ATLAS9 (Castelli and Kurucz)
Linelist: linemake (<https://github.com/vmplacco/linemake>)
Spectroscopic analysis: Spectroscopy Made Harder (<https://github.com/eholmbeck/smhr-rpa>)



Mean U abundance using 3859, 4050 and 4090 Å absorption lines comparable to literature abundances from 3859 Å line.



Age estimates of the stars using radioactivity of U and Th. First age-estimates using multiple U lines!