Nucleosynthesis beyond iron and the lighter element primary process
EMMI-JINA workshop, Darmstadt, Germany, October 10 -12, 2011

Three observational findings for testing the theory

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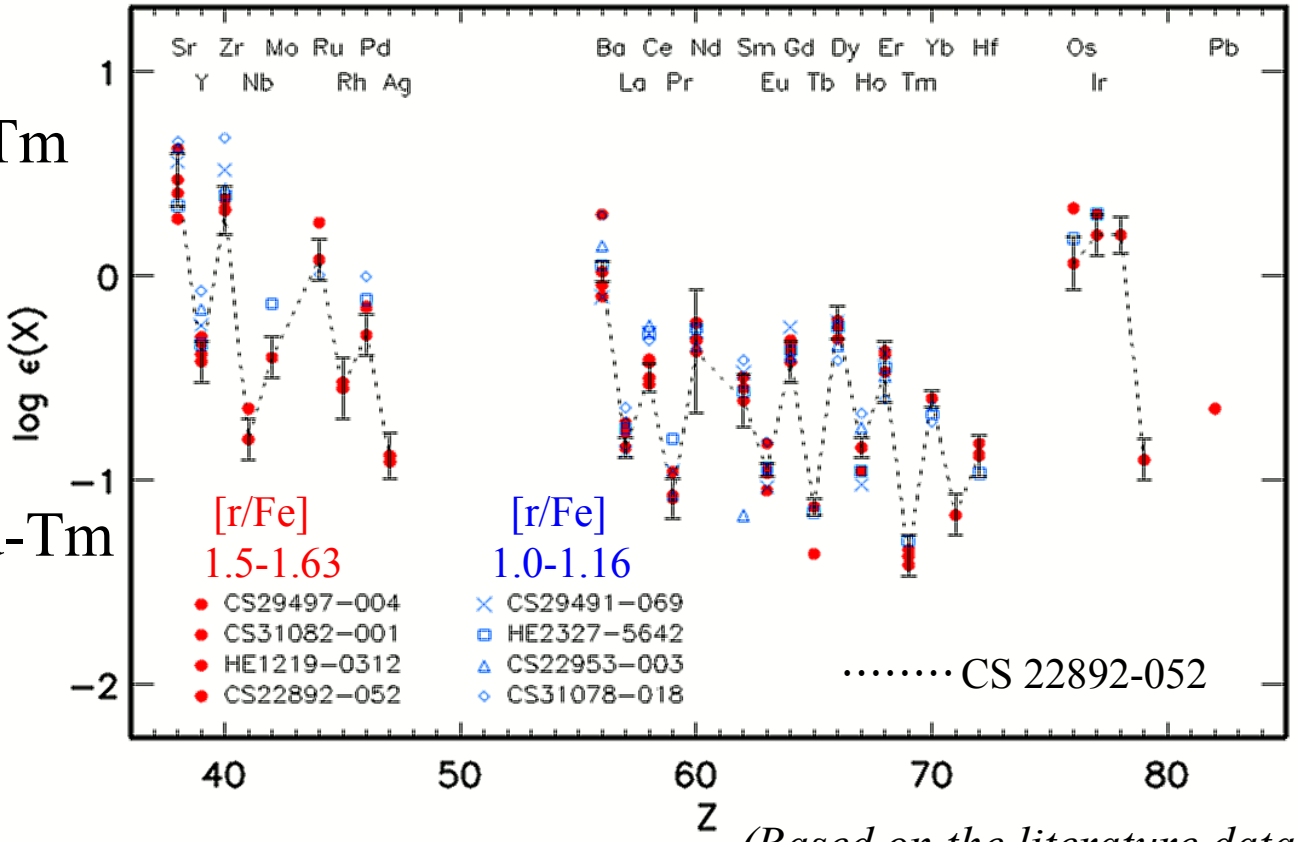
1

r-II stars ([Eu/Fe] > 1, [Ba/Eu] < 0) have similar abundance pattern in Sr-Hf range.

Element abundances scaled to match Eu-Tm in CS 22892-052.

r is the average of Eu-Tm

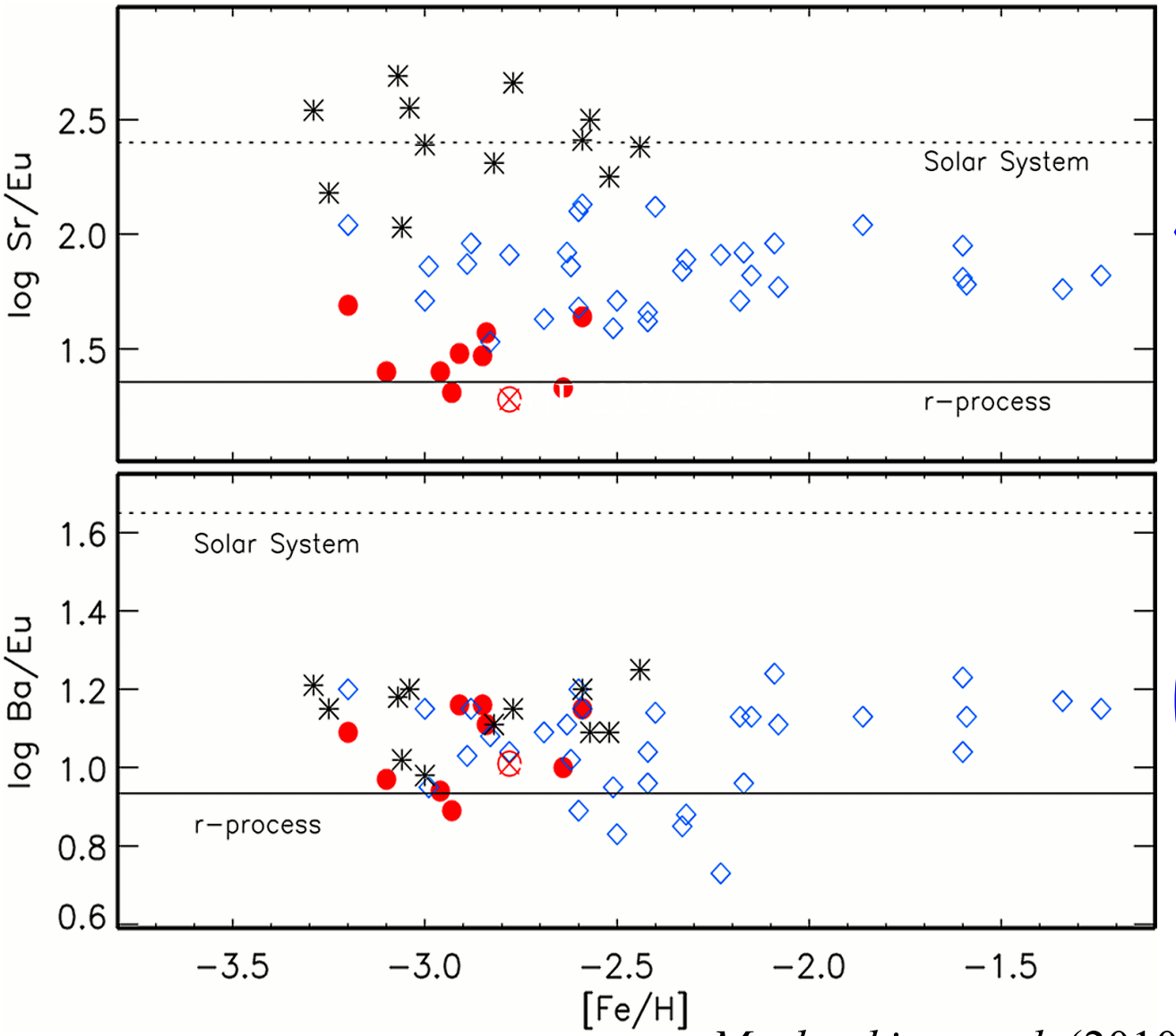


(Based on the literature data.)

The r-II stars provide empirical element production ratios for the r-process.

2

Sr/Eu: a clear separation between r-II, r-I, and Eu-poor groups



* [Eu/Fe] < 0, Eu-poor

◊ [Eu/Fe] = 0.2-1, r-I

● [Eu/Fe] > 1, r-II

53 selected stars with [Ba/Eu] < -0.4: Ba and beyond are of mostly r-process origin

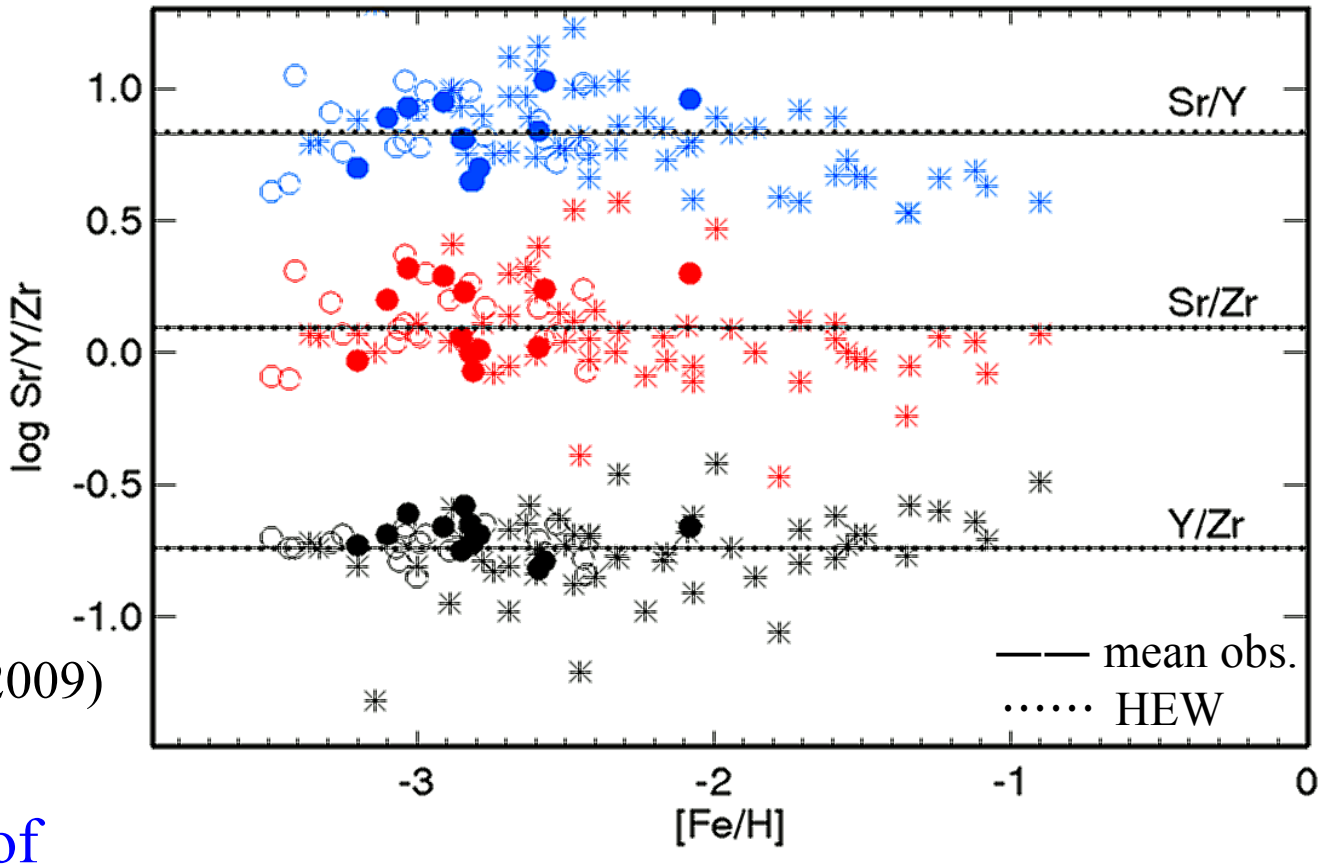
Mashonkina et al. (2010) using 13 sources of data.

Sr/Y/Zr: no distinction between r-II, r-I, and Eu-poor groups

○ ○ ○ Eu-poor

* * * r-I

● ● ● r-II



Farouqi et al. (2009)

Observations of

old stars born before the onset of the main s-process:

log(Sr/Y) = 0.83, log(Sr/Zr) = 0.09, log(Y/Zr) = -0.74

independent of Sr, Y, Zr production mechanism.

Dear John,

happy birthday to you!

Have you many success
in your science!