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Measuring thorium, uranium and lead in the ancient r-process star HE1523-0901 ANNA FREBEL, Massachusetts Institute of Technology (MIT) — Some old metal-poor Galactic stars formed from material enriched in the hehaviest elements made in the r-process. Their measured neutron-capture abundances near-perfectly match the scaled solar r-process pattern for the elements above Ba. This universality enables age measurements of these rare r-process stars. In the case of star HE 1523-0901, an age of 13.2 Gyr was derived from multipe abundance ratios involving Th, U and other heavy stable elements. We now present new results on a Pb abundance measurement. Our Pb measurement of the total produced lead strongly constraints the various Pb production channels in the r-process that occur in addition to the decay component by the Th and U decay. We find good agreement with current "waiting point" models for the production of elements in the actinide region. This implicitly also improves the r-process model used for obtaining initial production ratios on which the stellar ages deteminations are based. With this good level of agreement, HE 1523-0901 is already a vital probe for observational "near-field" cosmology by providing an independent lower limit for the age of the Universe.

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