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Neutron Capture Rates and the r-Process in a Range of Possible Environments CHRISTOPHER ALLEN, SEAN COLLISON, ANA MIKLER, REBECCA SURMAN, Union College — We examined the role of neutron capture rates in the r-process by running and analyzing sensitivity studies. The sensitivity studies were composed of r-process simulations in which we chose successful r-process conditions, ran a baseline simulation, and then repeated the simulation thousands of times with the neutron capture rate of each nucleus individually modified by a factor of 100. We then looked at the effects of the final abundance patterns and found the nuclei whose capture rates make the biggest changes to the patterns. Previous research focused on specific regions of the nuclear chart - A 130 region, the rare earth region, or the A 195 region - and examined only a small set of r-process conditions. For our research we expanded the range of nuclei considered to all of the isotopes of elements with 40 < Z < 99, and we studied ten trajectories that had very different environmental conditions. We found that many of the same neutron capture rates were important even in very different conditions.

Christopher Allen Union College

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