

Title:

Heavy elements in Red Giant Stars

Abstract:

About half of all elements heavier than iron are synthesized by the slow neutron capture process (s-process).

The main site of the s-process is confirmed both observationally and theoretically to be evolved red giant stars

on the asymptotic giant branch (AGB). Even so we are still a long way from having accurate, quantitative theoretical predictions of s-process production from AGB stars covering the full range of mass. That is, stars

with initial masses between about 0.8 to 8 solar masses and perhaps up to 10 solar masses (the super-AGB stars).

In this talk I will focus on recent highlights of my research including a discussion of important problems and modeling uncertainties. I will look at how the initial helium abundance effects stellar evolution and nucleosynthesis in surprising ways, at the clues emerging from observations of post-AGB stars, and how small changes in nuclear physics data can profoundly affect stellar nucleosynthesis and our understanding

of the origin of the elements.