THE s-PROCESS IN THE YELLOW SYMBIOTIC AG DRACONIS

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Abstract. An abundance analysis of the yellow symbiotic system AG Draconis reveals it to be a metal-poor K giant ([Fe/H] = −1.3) which is enriched in the heavy *s*-process elements. This star thus provides a link between the symbiotic stars and the binary barium and CH stars which are also *s*-process enriched. These binary systems, which exhibit overabundances of the heavy elements, owe their abundance peculiarities to mass transfer from thermally-pulsing asymptotic giant branch stars, which have since evolved to become white-dwarf companions of the cool stars we now view as the chemically peculiar primaries. A comparison of the heavy-element abundance distribution in AG Dra with theoretical nucleosynthesis calculations shows that the *s*-process is defined by a relatively large neutron exposure ($\tau = 1.3$ mb^{-1}), while an analysis of the rubidium abundance suggests that the *s*-process occurred at a neutron density of about 2×10^8 cm^{-3}. The derived spectroscopic orbit of AG Dra is similar to the orbits of barium and CH stars. Because the luminosity function of low-metallicity K giants is skewed towards higher luminosities by about 2 magnitudes relative to solar-metallicity giants, it is argued that the lower metallicity K giants have larger mass-loss rates. It is this larger mass-loss rate that drives the symbiotic phenomena in AG Dra and we suggest that the other yellow symbiotic stars are probably low-metallicity objects as well.

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Discussion

North: What is the orbital period of this system?

Cunha: A CORAVEL orbit yields $P = 549 \pm 7$ d, in agreement with the value obtained by Mikołajewska et al. (1995, *AJ*, 109, 1289).

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