Heavy puzzle pieces: Learning about the i process from Pb abundances

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The large majority of elements heavier than iron are formed by the slow (s) and rapid (r) neutron capture processes. However, it has become clear that a neutron capture process operating at neutron densities intermediate to the s and r process (i process) gives rise to its own characteristic abundance pattern. This i-process pattern is successful at reproducing observed heavy-element abundances that could not be explained previously, e.g. those of carbon-enhanced metal-poor stars that show enrichments of s- and r-process elements (CEMP-s/r). The required high neutron densities may occur in the thermal pulses of Asymptotic Giant Branch (AGB) stars as a result of proton ingestion episodes. However, the sites of the i process are as yet unknown. Comparing theoretical predictions of i-process nucleosynthesis with the observed abundance patterns of CEMP stars and post-AGB stars in the Magellanic Clouds allows us to learn about the thermodynamic properties of possible i-process sites. In particular the Pb abundances may hold the key to solving this mystery because this is one element that is predicted to be significantly enhanced by the s process at low metallicities, in contrast to observations of post-AGB stars which only show low to moderate Pb enhancements. In this talk I will present the results of nuclear-network calculations of i-process nucleosynthesis in comparison to observations.