Isotopic Abundances in Presolar SiC Grains accounted by s-Processing from MHD-induced Mixing in low mass AGB stars

Sara Palmerini,[1,2] Maurizio Busso,[1,2] and Diego Vescovi[3,2]

[1] *Dipartimento di Fisica e Geologia Università degli Studi di Perugia, Italy*

[2] *I.N.F.N. sezione di Perugia, Italy*

[3] *Gran Sasso Science Institute, L'Aquila, Italy*

In the past years the observational evidence that s-process elements from Sr to Pb are produced by stars ascending the so-called Asymptotic Giant Branch (or AGB) could not be explained by self-consistent models, forcing researchers to extensive parameterizations. The crucial point is to understand how protons can be injected from the envelope into the He-rich layers, yielding the formation of ^{13}C and then the activation of the ^{13}C(α,n)^{16}O reaction. Only recently, attempts to solve this problem started to consider quantitatively physically-based mixing mechanisms. Among them, MHD processes in the plasma were suggested to yield mass transport through magnetic buoyancy. In this framework, we compare results of nucleosynthesis models for low mass AGB stars (M$\leq$3M$_\odot$), developed from the MHD scenario, with the record of isotopic abundance ratios of s-elements in presolar SiC grains, which were shown to offer precise constraints on the ^{13}C reservoir. We find that n-captures driven by magnetically-induced mixing can well account for the SiC data and that this is due to the fact that our ^{13}C distribution fullfils the above constraints rather accurately. We show comparisons between model predictions and measurements for isotopes of Sr, Zr, Ba, Mo and Ru as representative examples of light and heavy s-elements.