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Nucleosynthesis and wind yields of Very Massive Stars

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The most massive stars provide an essential source of recycled material for young clusters and galaxies. While very massive stars (VMS, M > 100$M_\odot$) are relatively rare compared to O stars, they lose disproportionately large amounts of mass already from the onset of core H-burning. In this talk, I will discuss the impact of stellar wind yields from VMS, calculated for a wide range of masses (50–500$M_\odot$). I will present chemical yields for metallicities ranging from $Z_\odot$ down to 1% solar metallicity, using the MESA stellar evolution code with updated mass-loss prescriptions. We find that for VMS at solar metallicity, 95% of the total wind yields are produced already on the main sequence, while only ~ 5% is supplied by the post-main sequence. With optically-thick winds, these VMS eject significant quantities of H-burning products such as ^{14}N, ^{20}Ne, ^{23}Na, and ^{26}Al. At low metallicity, VMS can also produce Na-enriched and O-depleted material which is key for the observed anti-correlations in globular clusters.

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