

Workshop

Stellar End Products: The Low Mass - High Mass Connection

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Title:

Formation of carbon grains in red-supergiant winds of very massive Population III stars

Abstract:

We investigate the possibility of dust formation in a red-supergiant (RSG) wind of a very massive Population III star with a zero-main sequence mass of 500 Msun, based on the wind-gas composition obtained from the calculations of stellar evolution. We show that, in a constant-velocity wind, carbon grains can efficiently form for wide ranges of the mass-loss rate $(0.1-3) \times 10^{-3}$ Msun/yr and wind velocity 1-100 km/s, producing, at most, 1.7 Msun of carbon grains during the RSG phase. We also discuss the effects of the acceleration of the wind driven by newly formed dust on the dust formation.