

## CEPHEID EVOLUTION WITH PULSATIONALLY-DRIVEN MASS LOSS

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**Abstract.** We have studied the effects of a pulsationally-driven wind on Cepheid evolution. Mass loss due to the wind, which occurs only when the star is crossing the Cepheid instability strip, is a function of luminosity and radius. We have investigated the evolution of 4, 5, 6, 7 and 8  $M_{\odot}$  stars using the updated  $^{12}\text{C}(\alpha, \gamma)^{16}\text{O}$  rates.

Our results show that even a small amount of mass loss reduces the rate of period change for all masses. Even a small amount of mass loss moves the blue tip back toward the blue edge of the strip, and since the stars evolve more slowly as they approach the tip, even a slight reddening of the tip can significantly increase the time spent in the Cepheid strip.

Also, since the luminosity, and therefore the period, are not greatly affected, as the star loses mass, its evolutionary mass becomes in better agreement with pulsational masses.

The blue loop tips for the 5 and 6  $M_{\odot}$  stars lie close to blue edge of the instability strip to begin with, so a small amount of mass loss is sufficient to affect the evolution. A mass loss rate on the order of  $10^{-7} M_{\odot} \cdot \text{yr}^{-1}$  will decrease the mass by about 10%, increase the Cepheid lifetime by a factor of two to five and decrease the period rate of change by a similar factor.