Contributed Talk

Splinter HotStars

Magnetic stars as a laboratory for constraining the weak-wind problem in massive stars

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Late-type massive stars are often reported to exhibit mass-loss rates that are smaller than predicted by more than an order of magnitude, a discrepancy referred to as the weak-wind problem. However, deriving the true mass-loss rates of weak-wind stars can be extremely difficult due to the lack of wind signatures in their spectra.

Global magnetic fields in massive stars bind the stellar wind up to the Alfven radius, greatly enhancing the circumstellar densities, and enabling the measurement of the intrinsic mass-loss rates of magnetic stars. HD 54879 (O9.7 V) is one of a dozen O-stars for which an organized magnetic field has been detected ($B \approx 2kG$). We acquired HST and XMM-Newton X-ray data for HD 54879. In addition, 35 optical spectra were secured to study its spectral variability. We performed a multiwavelength (X-ray to optical) spectral analysis using the Potsdam Wolf-Rayet (PoWR) model atmosphere code and the xspec software. The analysis enabled us to assess the intrinsic mass-loss rate of the star. In my talk, I will illustrate why the analysis of magnetic stars is essential for constraining the weak-wind problem of massive stars.