Introductory Astronomy

Week 5: Stellar Evolution

Clip 12: Massive Issues

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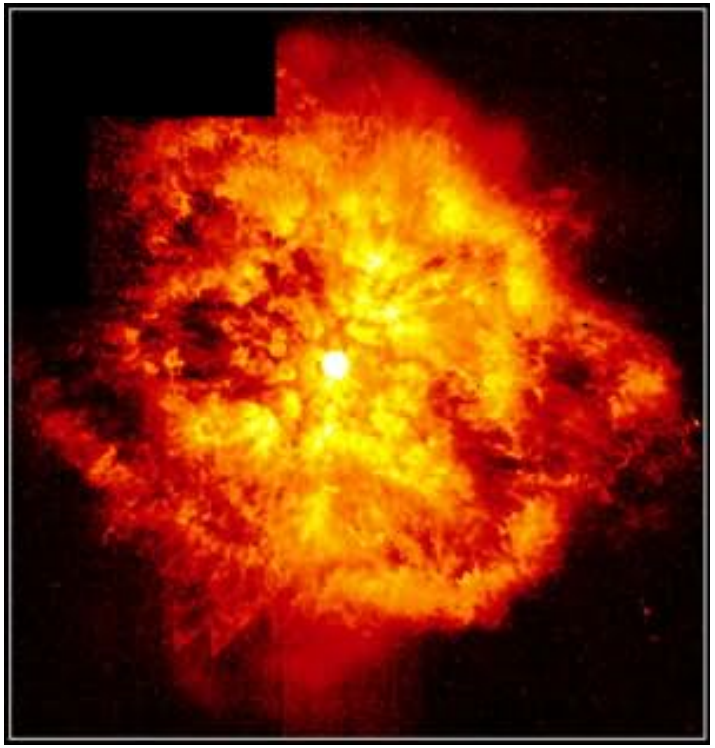
The Biggest Stars

- In type O stars with $M > 20 M_\odot$ evolution differs
- Departure from MS is horizontal. Helium fusion begins without core collapse
- Growth of envelope accompanied by extreme mass loss $10^{-4} M_\odot/\mathrm{yr}$
- Stellar wind produces spectra dominated by emission lines
- Show evidence of rapid rotation
- Recent: ¾ of O type stars have binary companion, ½ close enough for mass transfer

Wolf-Rayet Stars

- Classified by spectrum: WN WC WO
- Envelope essentially lost revealing interior composition
- Interior convection dredged up fusion products
- Important in enriching ISM
- Followed by core collapse SN



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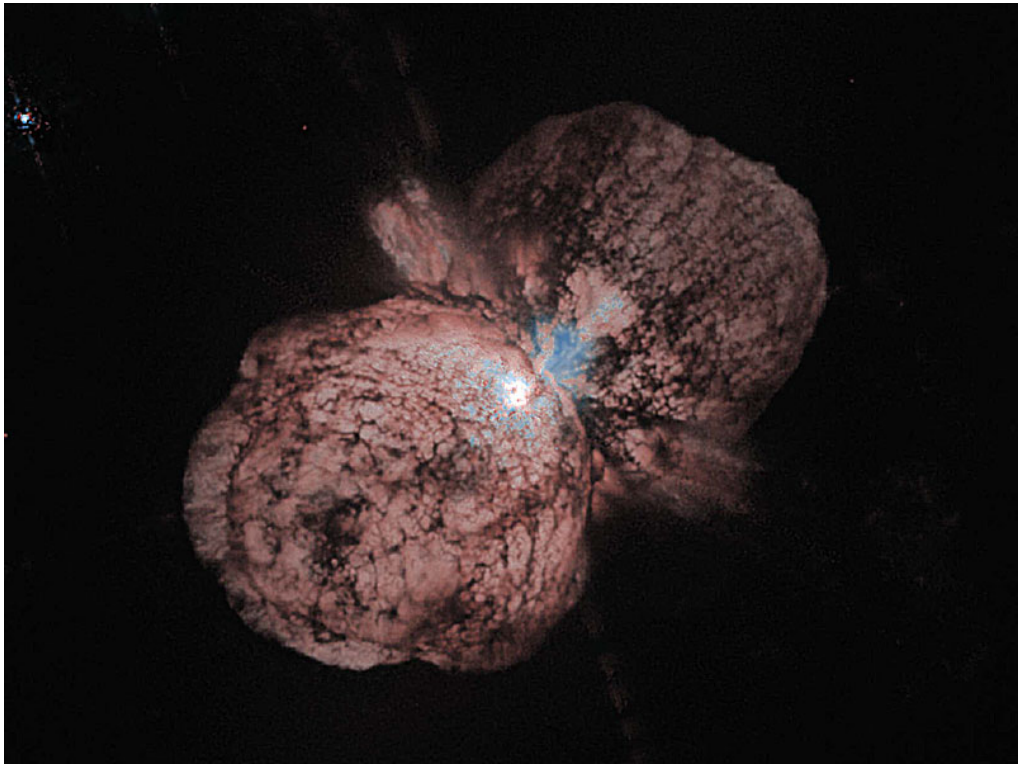
LBV Stars

- Stars with $M > 50 M_\odot$ never redden significantly
- Eta Carinae brightened to $L \sim 2 \times 10^7 L_\odot$ 1837 now $L \sim 5 \times 10^6 L_\odot$
- P-Cygni lineshape indicates mass loss



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Credits

- M1-67: Yves Grosdidier (University of Montreal and Observatoire de Strasbourg), Anthony Moffat (Universitie de Montreal), Gilles Joncas (Universite Laval), Agnes Acker (Observatoire de Strasbourg), and NASA http://hubblesite.org/gallery/album/entire/pr1998038a/
- Eta Carinae: J. Morse (Arizona State U.), K. Davidson (U. Minnesota) et al., WFPC2, HST, NASA http://apod.nasa.gov/apod/ap060326.html

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