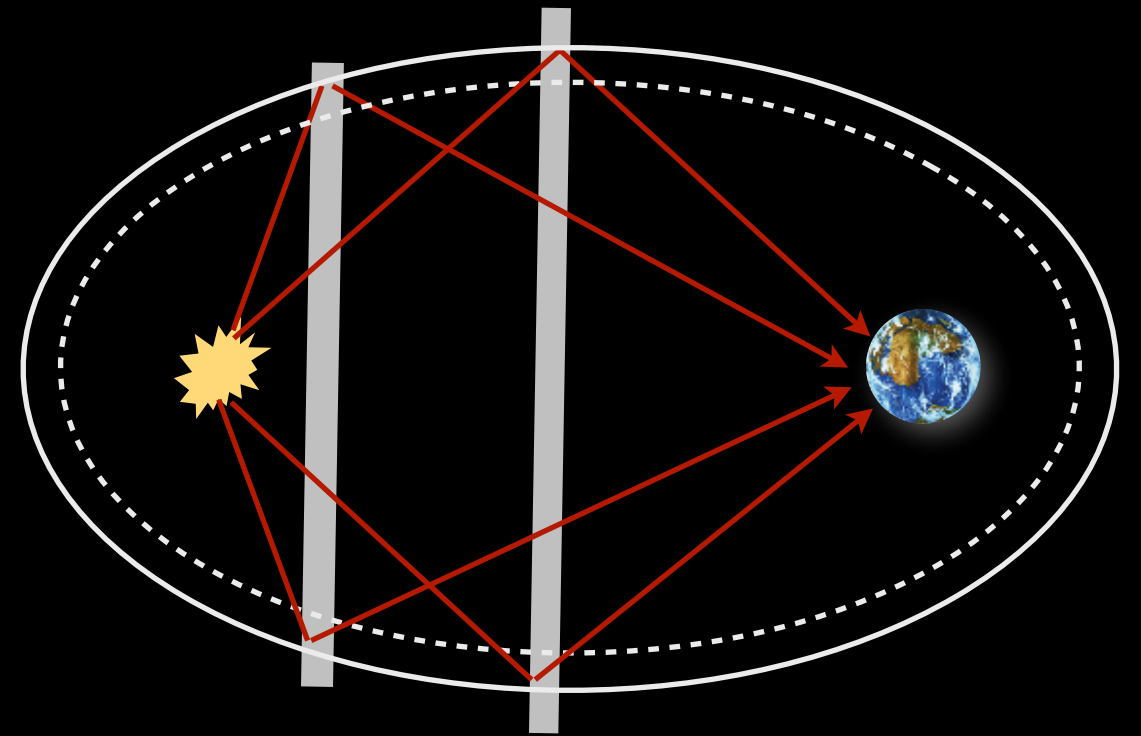


# what are light echoes?

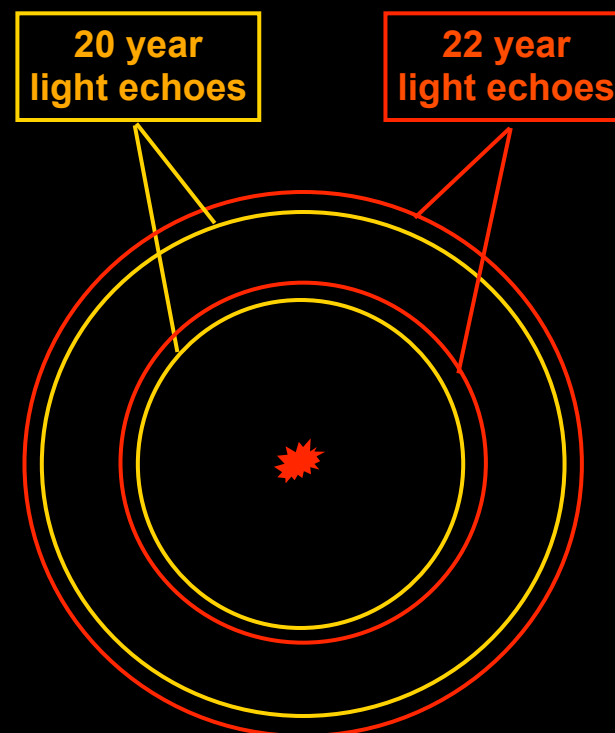
Light echoes of rapid bursts: SuperNovae



SN 1987A, difference image, 2003-2001



Xu, Crotts, & Kunkel (1995)



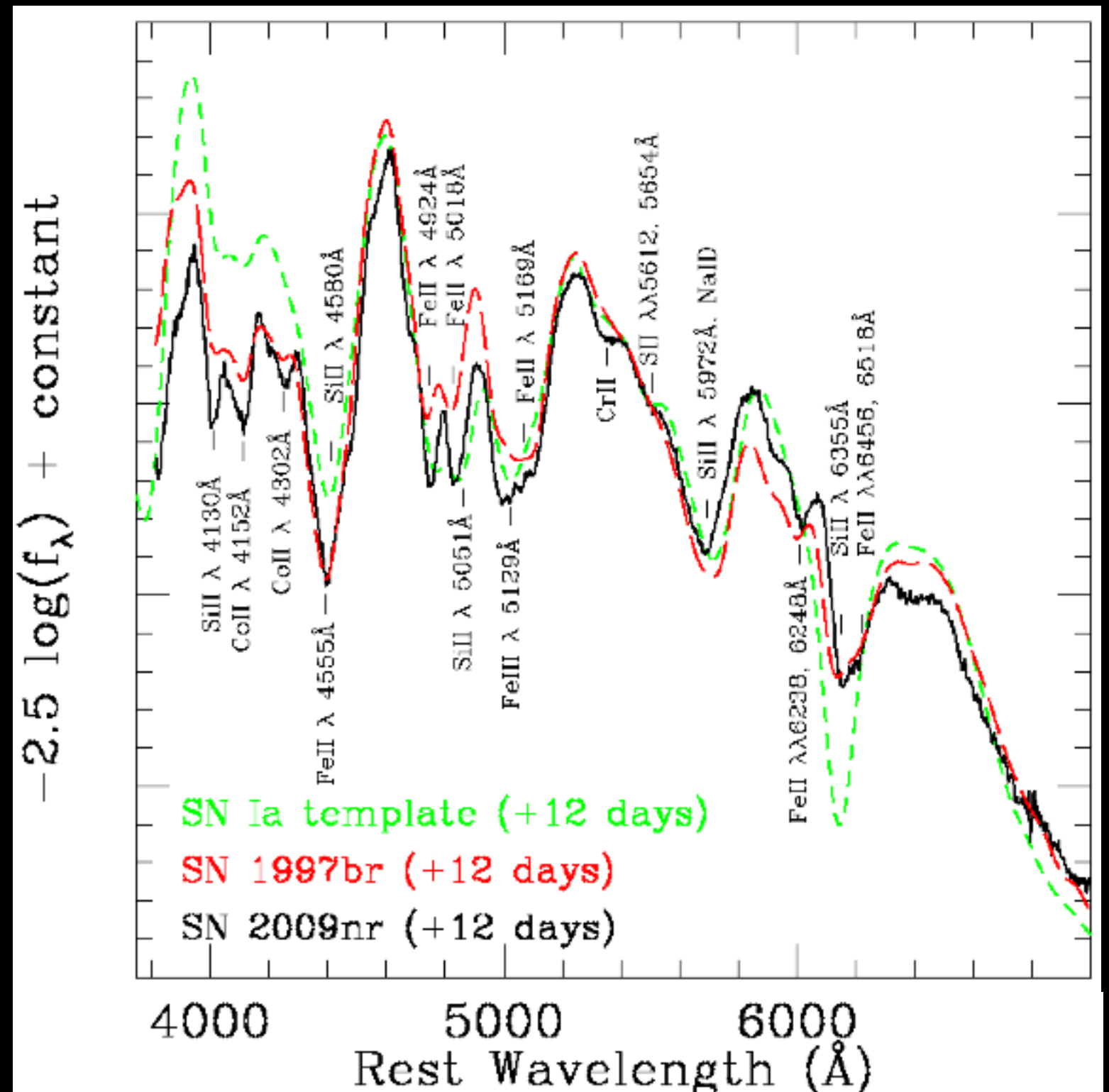
light echoes of  $\eta$ -Carinae

why study light echoes?

spectral classification LEs



spectra are the finger  
print of astronomical  
transient classification  
from light echoes.



Khan+ 2011

light echoes of  $\eta$ -Carinae