

# He II 4686 in eta Carinae: collapse of the wind-wind collision region during periastron passage

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The periodic spectroscopic events in eta Carinae are now well established and occur near the periastron passage of two massive stars in a very eccentric orbit. Several mechanisms have been proposed to explain the variations of different spectral features, such as an eclipse by the wind-wind collision boundary, a shell ejection from the primary star or accretion of its wind onto the secondary. All of them have problems explaining all the observed phenomena. To better understand the nature of the cyclic events, we performed a dense monitoring of eta Carinae with 5 Southern telescopes during the 2009 low excitation event, resulting in a set of data of unprecedented quality and sampling. The intrinsic luminosity of the He II 4686 emission line ( $L \sim 310 L_{\text{sun}}$ ) just before periastron reveals the presence of a very luminous transient source of extreme UV radiation emitted in the wind-wind collision (WWC) region. Clumps in the primary's wind probably explain the flare-like behavior of both the X-ray and He II 4686 light-curves. After a short-lived minimum, He II 4686 emission rises again to a new maximum, when X-rays are still absent or very weak. We interpret this as a collapse of the WWC onto the "surface" of the secondary star, switching off the hard X-ray source and diminishing the WWC shock cone. The recovery from this state is controlled by the momentum balance between the secondary's wind and the clumps in the primary's wind.

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