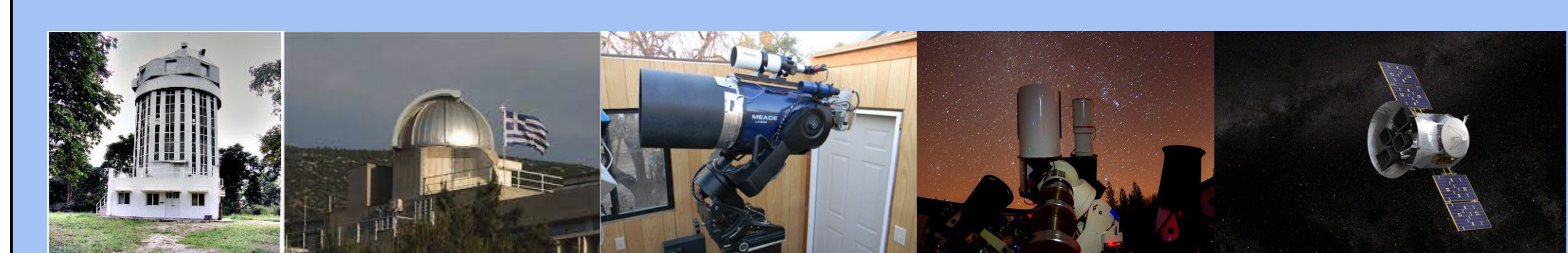
The mass of the white dwarf in GK Per

Ayoze Álvarez-Hernández[1,2], Manuel A. P. Torres[1,2], Pablo Rodríguez-Gil[1,2] (on behalf of a larger collaboration)
[1]Instituto de Astrofísica de Canarias, [2]Universidad de La Laguna

Our dynamical mass of the white dwarf in the cataclysmic variable GK Per reveals the inaccuracy of most previous mass estimates using X-ray spectral modelling.

We present here a dynamical study using data from 9 telescopes.

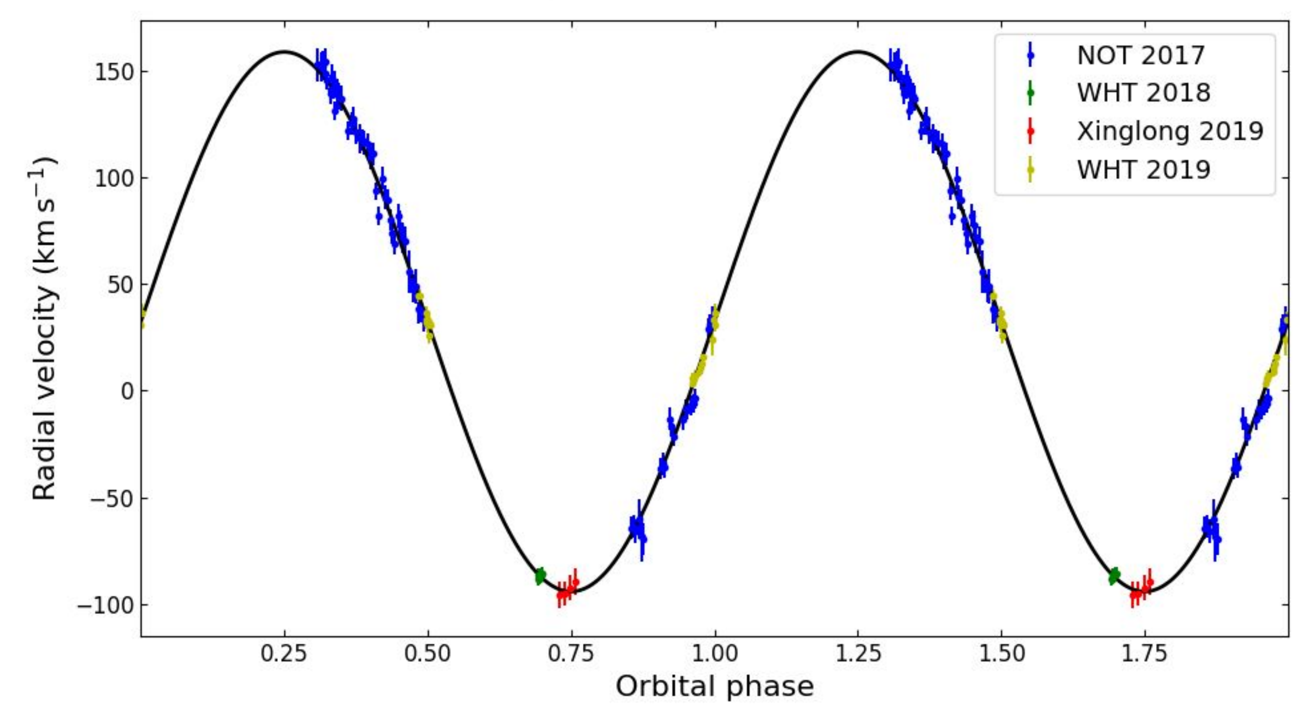
Spectroscopy: WHT, NOT, HCT, Xinglong telescope.



Photometry: 1.3-m JCBT, 0.4-m UOAO telescope, 0.3-m Sutter Creek, 0.43-m Sierra Remote, TESS.

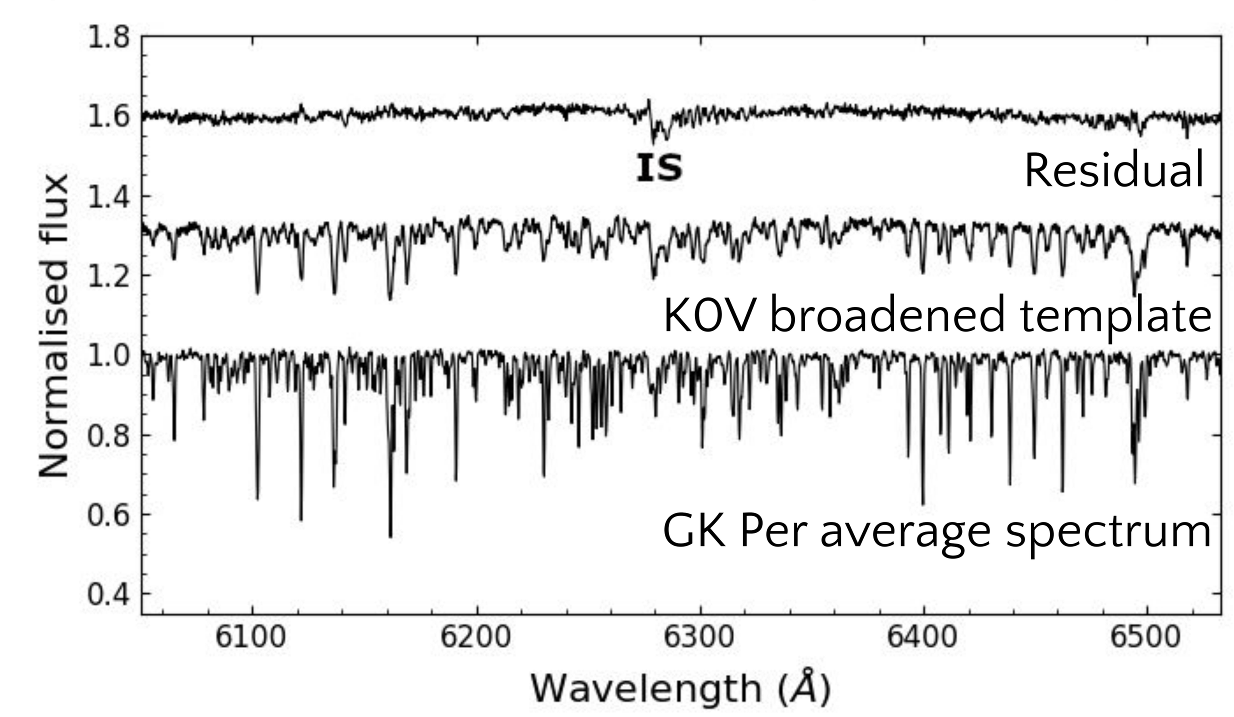
Dynamical masses

Radial velocity curve of the donor star



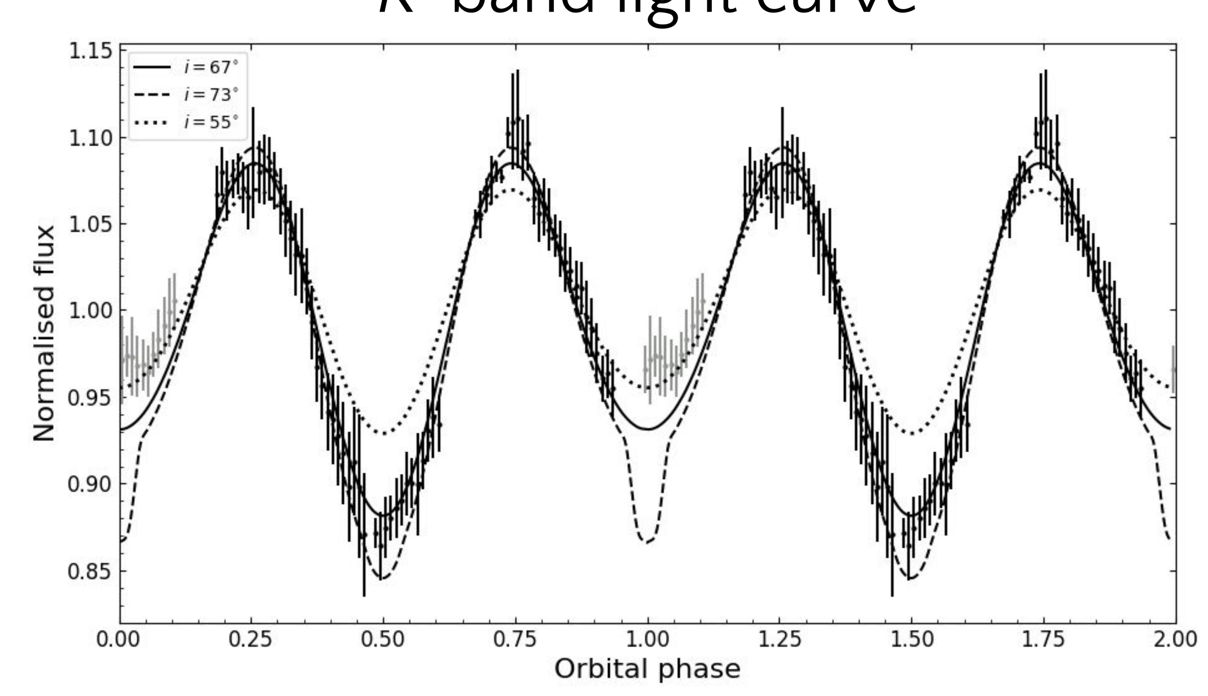
Semi-amplitude: 126.4 ± 0.9 km s^{-1}

Optimal substraction technique with high resolution spectroscopy



The rotational broadening of the donor's absorption lines is 52 ± 2 km s^{-1} .

R-band light curve



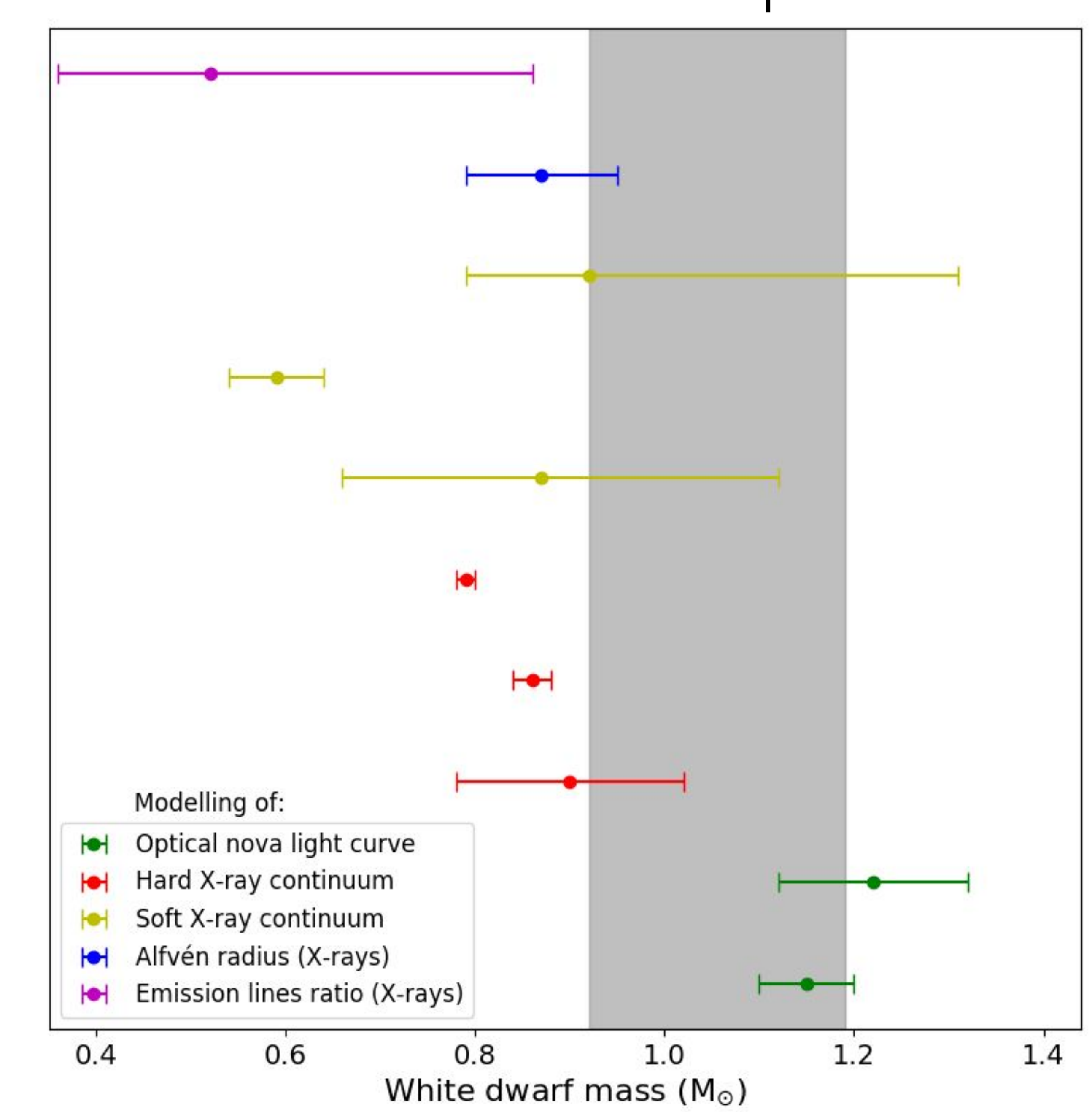
Modelling the ellipsoidal light curve yields an orbital inclination of 67 ± 5º.

Using these parameters: $M_1 = 1.03^{+0.16}_{-0.11}\,M_\odot$ $M_2 = 0.39^{+0.07}_{-0.06}\,M_\odot$

Comparison with previous estimates

We compared our white dwarf dynamical mass with several estimates obtained from indirect methods. Most values obtained from X-ray data have very large uncertainties and/or disagree significantly with our result. The shaded region in the figure below shows the range for the white dwarf mass based on our dynamical study. Different colors are used for each method.

White dwarf mass comparison



For more details check out our paper or contact me at ayozeav@iac.es