

TRANSIENTS:

(compact & close binaries)

BEFORE:

- masses
- donor evolution
- accretion mechanisms
- related variability

DURING:

- transient characterization
(kinematic, physics,
driving mechanisms)
- progenitor

AFTER:

- transient characterization
- product and long term
evolution
- stellar evolution

KEPLER RESULTS (before): aperiodic variability in BH, WD, YSO scales with mass, accretion rate and disk size

KEPLER RESULTS (before & during): disk size changes, long outburst precursors, test of accretion disk dynamic and precession

KEPLER SCIENTIFIC DRIVERS were not IBs, CVs and alike, nevertheless it is producing exceptional steps forward in the understanding of accretion disks in CVs AND accreting compact objects.

FERMI RESULTS (during): detection of γ -ray emission from CNe \leftrightarrow not predicted by theory; triggered new search for shocks

Coordinated multi-band observations results – X/Swift + UV/STIS + opt/FIES/HERMES/UVES HR spectra (during & after): optimization of the observing strategy at highly oversubscribed facilities & study of the geometrical and the ionization structure of the ejecta (identification of ejecta substructures and characterize of their evolution):

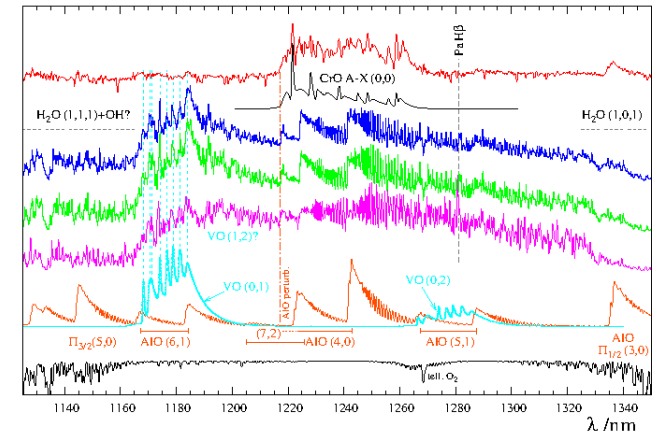
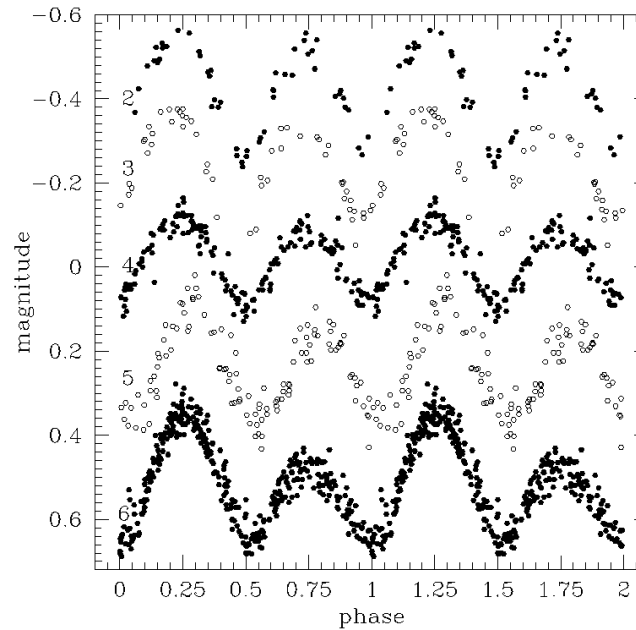
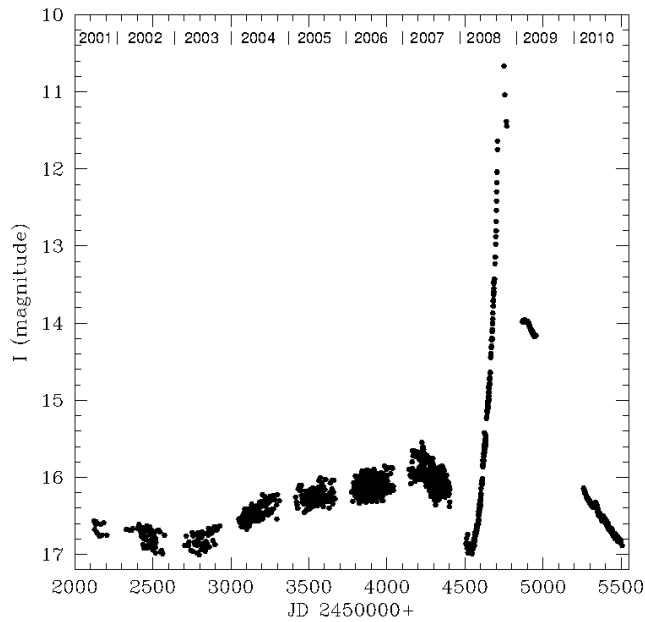
- 1) no wind in the ejection process but just a structured ejecta
- 2) no accelerating shells colliding into each other

(1) coordinated use of different facilities and (2) multi-wavelength approach are essential to modern astrophysics \rightarrow instrument's wavelength coverage should be broadened, together with instrument modes, while instrument setup reduced in order to maximize efficiency.

V1309 Sco is the first stellar merger ever observed in “real time”:

OGLE obs (before & during) + XShooter obs (during & after):

- 1) we have identified the red-novae phenomenon
- 2) we are learning how stellar mergers work, evolve and what do they produce
- 3) stellar mergers are numerous (0.16-0.2/yr)



serendipity

FK Com stars = rapidly rotating FGK giant stars ← stellar mergers / angular momentum dredge up / substellar companion accretors

Swift obs + Kepler light curves + MR opt spectroscopy: 20 new FGK active stars of which 9 (45%) are also evolved and rapidly rotating.

Asteroseismology (giant) + Kepler rotational period → 17 more FK Com stars
→ 1-2% of FGK giant stars

Interdisciplinary approach

SUMMARY / TAKE AWAY:

“Science drivers”: SI; ma senza monopolio: sia al momento della “prioritizzazione” delle osservazioni e della time allocation (1); sia al momento della progettazione (2).

(1) mantenere una frazione di tempo per progetti diversi/unforeseen/(minori)

(2) progettare strumenti il piu' versatili possibili: multi-wavelength (ma non multi setup) & multi-mode; & progettare strumenti unici e non repliche.

La scienza, come anche la strumentazione, va un po' a mode e, se si vuol fare ricerca base, la moda bisogna crearla, non (solo) seguirla.