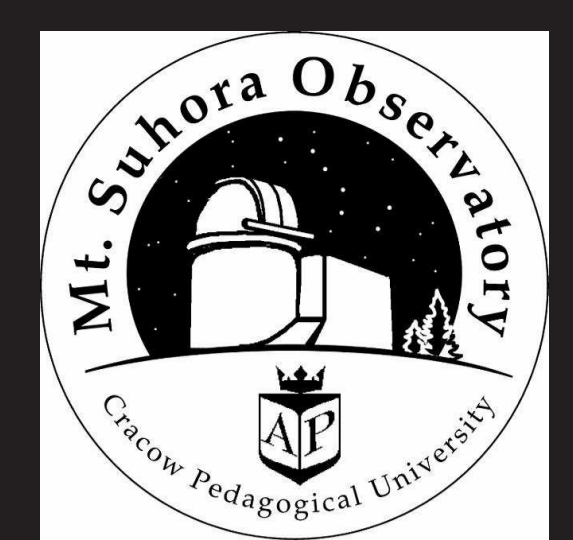


Young Stellar Objects observed by MOST

Michal Siwak & MOST team

Mount Suhora Observatory, Cracow Pedagogical University
ul. Podchorazych 2, 30-084 Krakow, Poland



Introduction

In the recent years the MOST satellite gathered dozens of high quality light curves of Young Stellar Objects (YSO). We present the most interesting results obtained from the data collected between 2009-2013.

Observations

The optical system of the MOST satellite consists of a Rumak-Maksutov f/6, 15 cm reflecting telescope. The custom broad-band filter covers the spectral range of 350 – 700 nm with the effective wavelength located close to the Johnson V band (Matthews et al., 2004). All targets listed below were observed in the *direct-imaging* mode of the satellite. For details of data processing see Siwak et al. (2010).

► Classical T Tauri, FUors and Herbig Stars

stars	year of observations
TW Hya	2007, 2008, 2009, 2011
RY Tau	2009
FU Ori	2010
Z CMa	2011
RU Lup, IM Lup	2012, 2013
AB Aur, SU Aur	2012

► Weak-lined T Tauri Stars (WTTS)

stars	year of observations
V410 Tau, V987 Tau	2009
Lupus 3-14	2009, 2010
Lupus 3-48	2009

TW Hya and mysterious "eclipses"

In contrast to the previous MOST runs the variations observed in 2011 were surprisingly regular showing roughly equidistant spikes at typical separation of about 4 days. The data reveal also a dozen of well defined dips, which we call "eclipses" (third and fourth panel). We suggest, that these may be eclipses of hot spots created at the footprints of accretion columns caused by "dusty clumps" orbiting the star on highly inclined orbits.

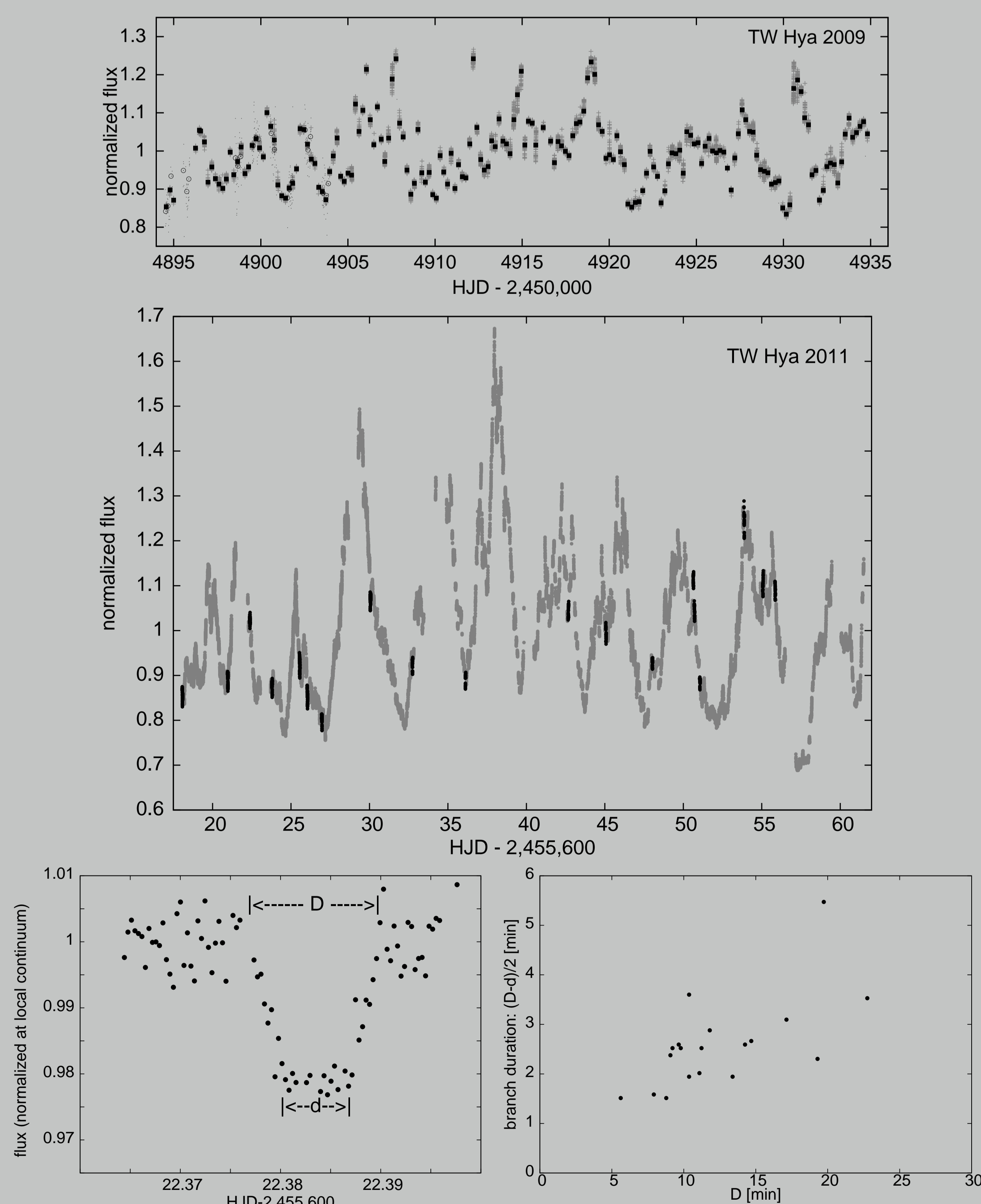


Figure 1: Differences between light curves of TW Hya obtained in 2009 and 2011. The darker points in 2011 data represent single MOST orbits containing "eclipses" (see third panel). The fourth panel shows relation between total eclipse duration D and branch duration $(D-d)/2$. (Siwak et al., 2011a and Siwak et al., in prep.)

Quasi-periodic oscillations in FU Orionis

The light curve of FU Ori obtained during 28 days reveals two main 9-8 and 2.4-2.2 days quasi-periodic features occurring nearly simultaneously. Their periods may shorten slowly which may be due to spiralling in of individual plasma parcels toward the inner disc radius, estimated at $4.8 \pm 0.2 R_{\odot}$ – this value agrees well with the estimates from interferometric observations (Siwak et al., 2013 and references therein).

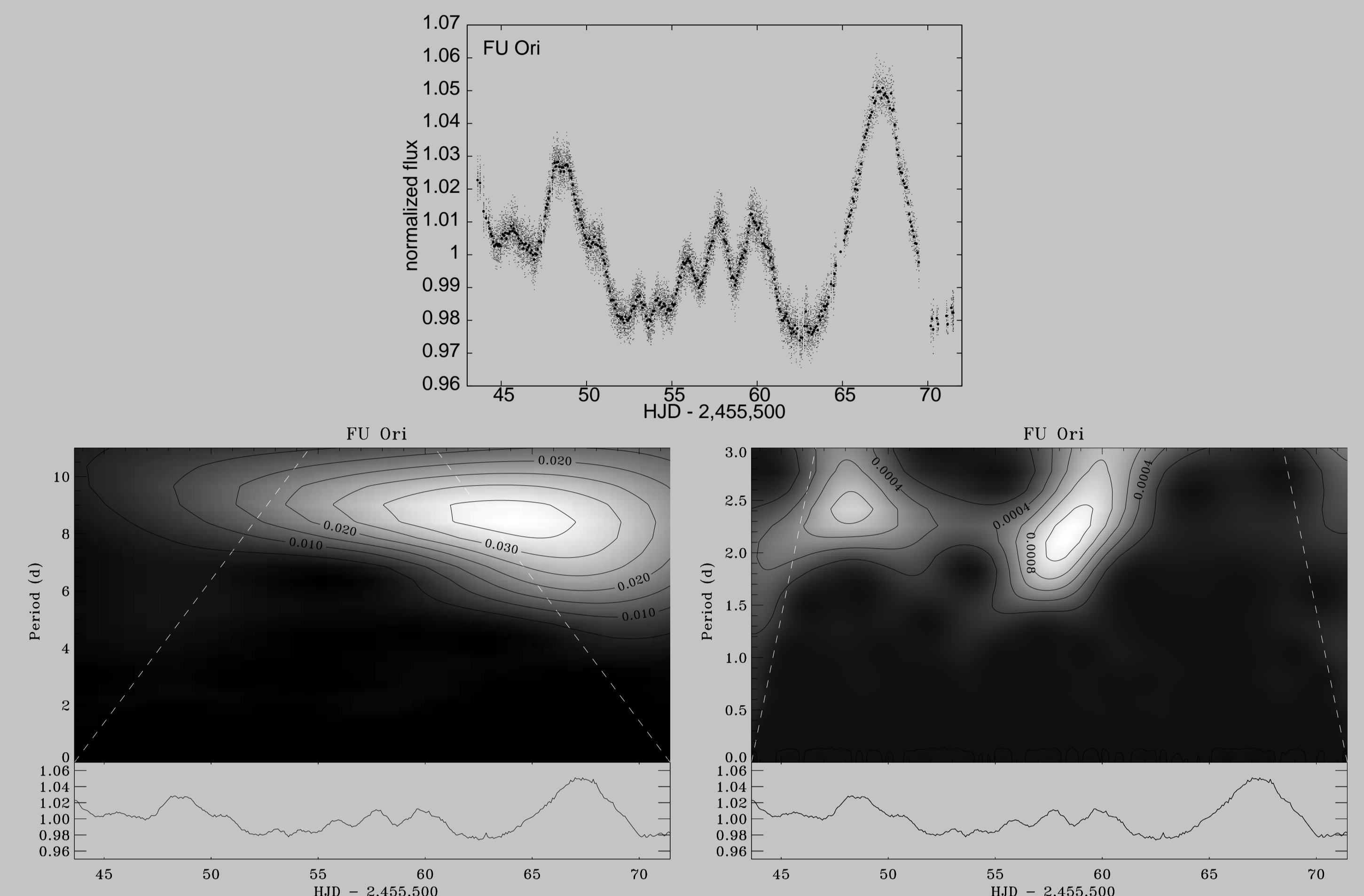


Figure 2: Light curve of FU Ori (first panel) and its Morlet-6 wavelet spectra (next two panels).

Differential rotation of Weak-lined T Tauri Stars

The light curves of a few WTTS observed by MOST are modulated by cold spots. A simple model assuming one large polar spot and second smaller localized closer to the stellar equator well reproduces the observed light variations. Assuming that the spots are invariable in time, differential rotation can be determined, as in the case of V987 Tau and Lupus 3-14. The two remaining stars seems to rotate rigidly (Siwak et al., 2011b).

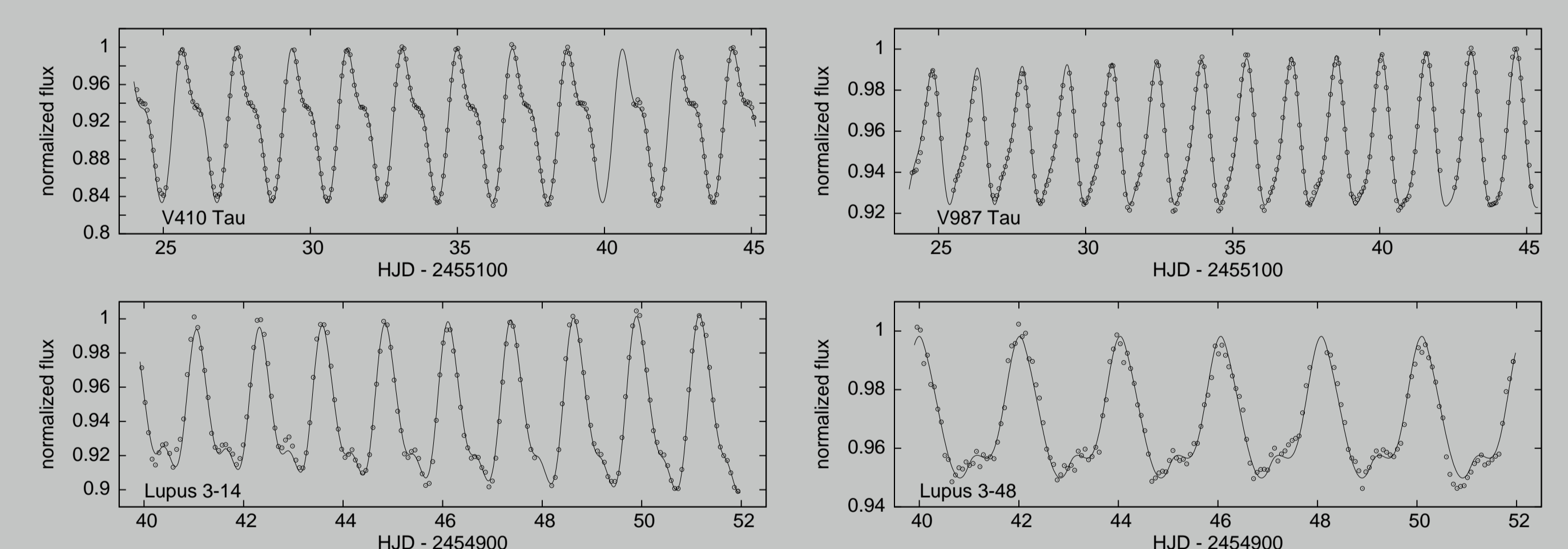


Figure 3: Light curves of V410 Tau, V987 Tau, Lup 3-14 and Lup 3-48.

Conclusion

This is just the sample of results obtained for a few YSOs by the smallest space telescope. The data obtained for SU Aur & AB Aur and RU Lup & IM Lup are currently under analysis. In the near future, we plan to complete photometric survey of all Classical T Tauri-type Stars brighter than $V \approx 11.5$ mag and available for the MOST satellite. A longer run, necessary for detailed characterisation of FU Ori quasi-periodic oscillations will take place during the 2013-2014 Winter season.

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