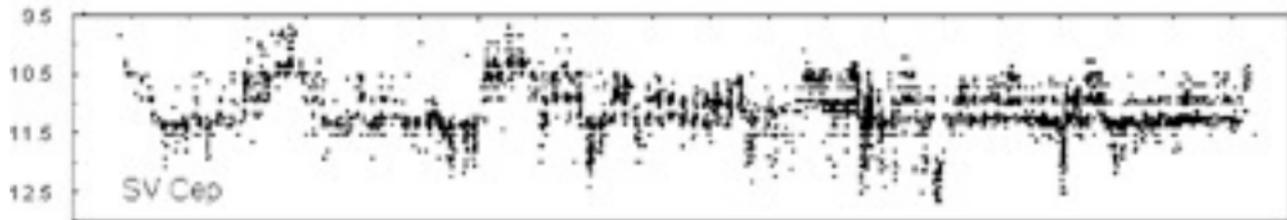


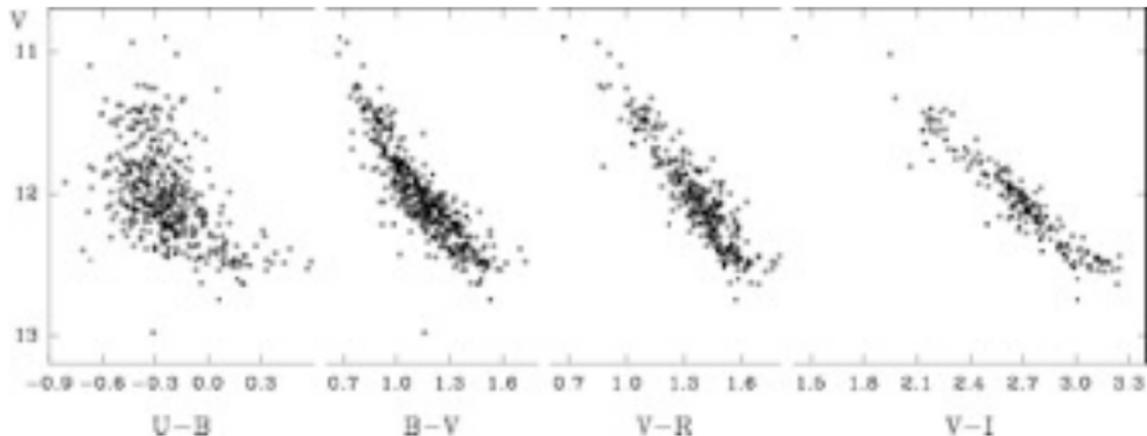
Activity of UXORs in the Infrared

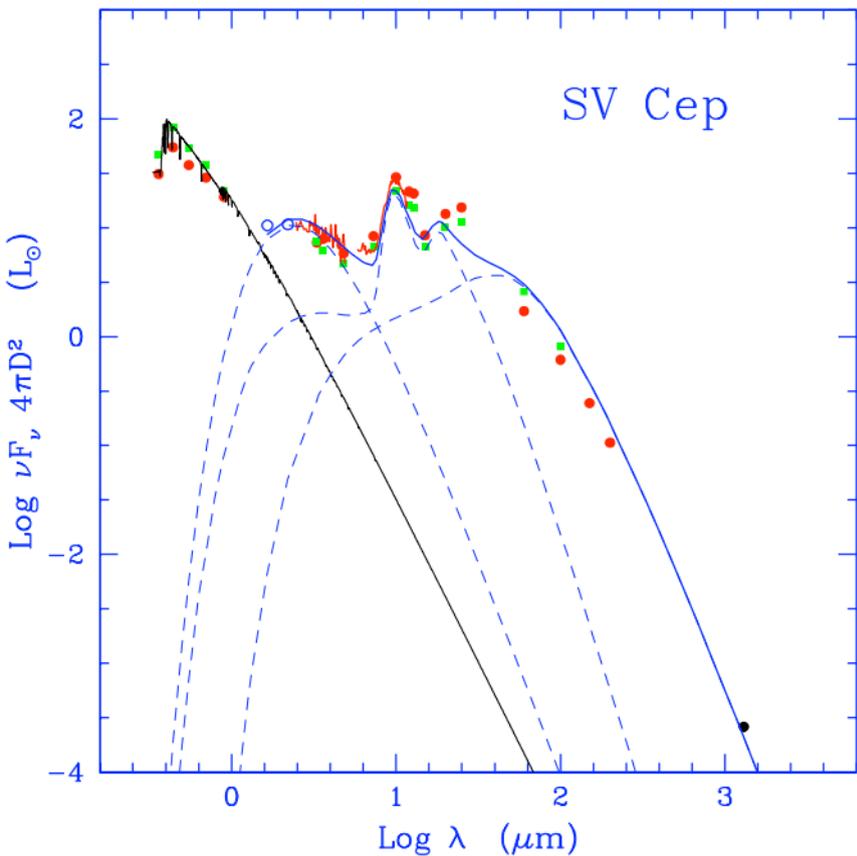
Timo Prusti
ESA

- Introduction: Tuning to wavelengths beyond $3 \mu\text{m}$
- IRAS: Proof of variability
- ISO: Study of variability
- Future look



UXor phenomenon: irregular optical minima of max 2 mag lasting max week of two





- NIR is a combination of star and disk
- At MIR wavelengths and beyond disk dominates
- Rim, Disk atmosphere, Disk mid-plane from 3, 15 to 100 μm

- Absorption: detailed study of the line-of-sight
- NIR: mixed case of emission and absorption
- Emission: study of the whole system with the potential to connect UXORs with HAEBEs without UXOR phenomenon

- IRAS was tuned to produce reliable Point Source Catalog by redundancy with seconds, hours and weeks confirmation
- After knowing the reliability, available redundancy can be used to study variability in the available time scales
- Accuracy estimates based on 30228 and 11586 non-variable stars at 12 and 25 μm give 6 and 7 % accuracy respectively

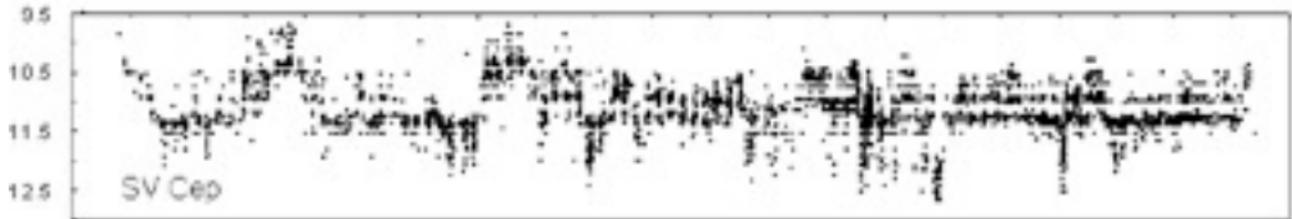
- No systematic, statistical IRAS variability study of UXORs exist
- Case study: IRAS variability of AB Aur (0.27 and 0.17 mag) and WW Vul (0.22 and 0.15 mag) at 12 and 25 μm respectively

	12 μm	25 μm
WW Vul	1.85 1.50	2.32 2.02
AB Aur	30.4 23.4	49.6 42.5
	[y]	[y]

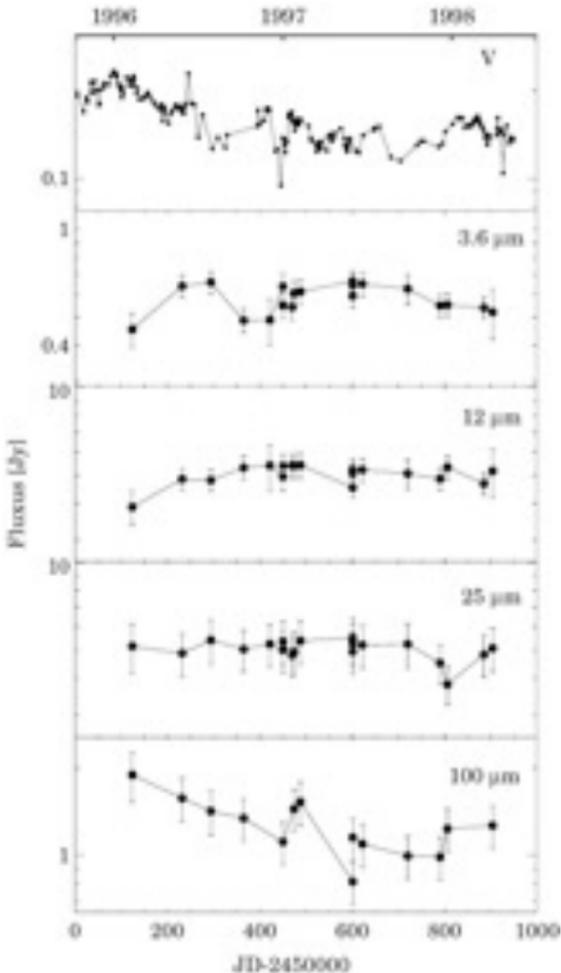
- Confirms structural changes in the circumstellar environment of UXORs
- Structural changes are from few events rather than of an ensemble of events; whatever the event
- Time scales: absorption is convolution of the phenomenon and dynamics while emission should be there as long as the structure exists

ISO

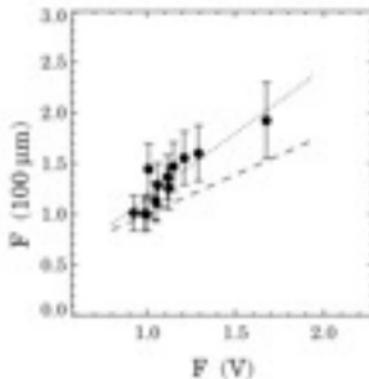
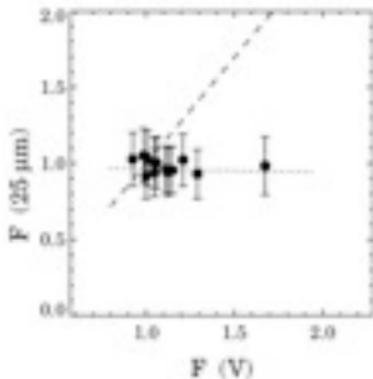
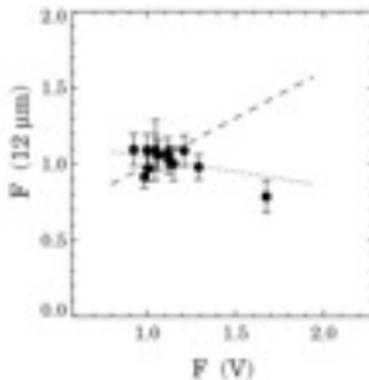
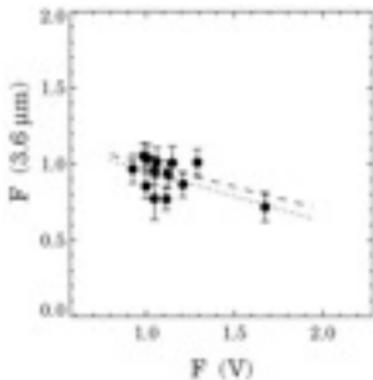
- Dedicated variability programme on UXORs
- BUT
- ISOPHOT used instead of ISOCAM
- Time coverage limited by visibility
- Only one UXOR warranted a detailed study: SV Cep (Juhasz et al 2007)
- The same observer setup did not ensure the same observational setup i.e. faced with absolute accuracy rather than with relative accuracy



- Last 100 years in visible light (Gurtler et al 1999)
- Recent years amplitude has decreased to 1 mag
- Rostopchina et al (2000) shows small amplitude colour changes compatible with reddening



- Within error bars no convincing evidence of variability
- However, global tentative trends: 3.6 μm anti-correlates with V; 25 μm is flat; 100 μm correlates with V



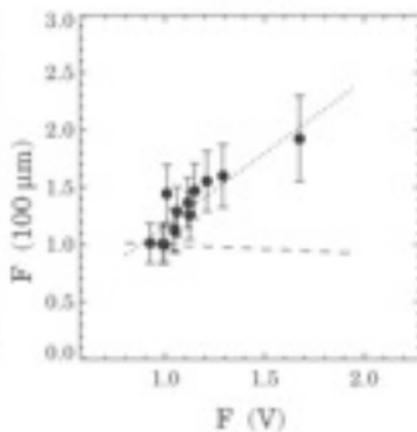
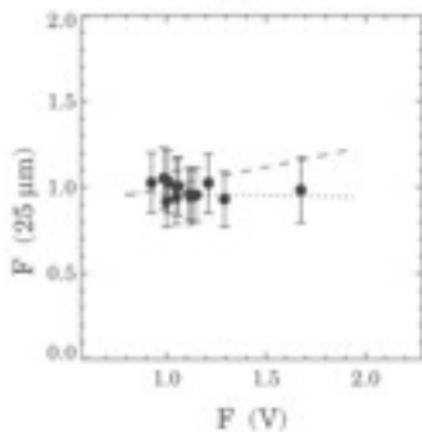
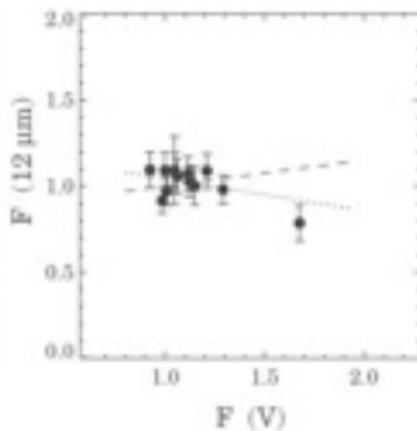
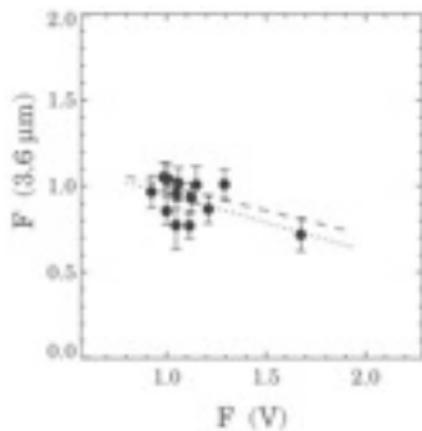
Observations
(dotted line):

- At 3.6 μm tentative anticorrelation (-0.55)

- At 100 μm correlation (0.88)

Disk model
(dashed line)

- No fit at 12 and 25 μm



Disk+envelope
model (dashed
line)
•No fit at $100 \mu\text{m}$

- No model fully compatible with SV Cep IR variability
- Quality of data does not warrant drastic refinement of models
- Better observational characterisation of IR variability necessary

Future Look

- Herschel: $>60 \mu\text{m}$ possible from 2009 onward
- Akari: “warm” observations possible in shorter wavelengths; waiting for AO results
- Ground: It is possible to device high quality monitoring programme and the difficulty is to get over the hurdle caused by a non-standard observing request

