

# A COROT short run on the NGC 2264 star-forming region

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## NGC 2264: an unique opportunity

- NGC 2264: only nearby SFR accessible to Corot
- Well studied SFR
  - Optical (photo, spectro), IR, X-ray data available
- Ideal conditions thanks to dark cloud in the back of cluster



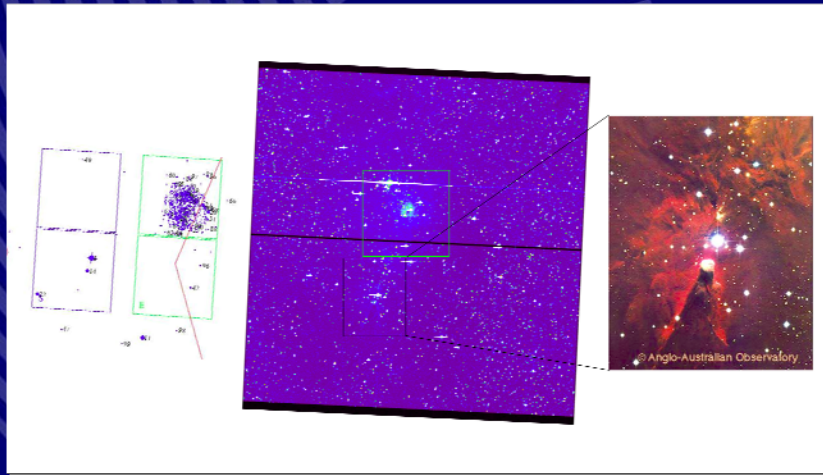
In 10 minutes I will only be able to give you some highlights.

## NGC 2264: key characteristics

- Distance ca. 760 pc
- Age: median 3 Myr (up to 5 Myr dispersion)
- Rich population of accreting and non-accreting stars across the HR diagram
- Ongoing star-formation



# The COROT observation the pretty picture



## NGC 2264: opportunities and science themes

- Occultations and transits
  - Sub-team led by S. Aigrain (poster)
- Accretion processes
  - Sub-team led by S. Alencar (talk)
- Rotation and activity
  - Sub-team led by G. Micela (poster L. Affer)
- Asteroseismology
  - Sub-team led by K. Zwintz (talk)



Emphasize organization aiming at maximum exploitation of the data

## Supporting observations

- Simultaneous observations in a number of spectral bands
  - X-rays (Chandra, G. Micela PI, see poster)
  - UV (SWIFT, I. Pagano PI, see poster)
  - Spectroscopy of selected systems (see. S. Alencar's talk)
- Post-facto complementary observations ongoing



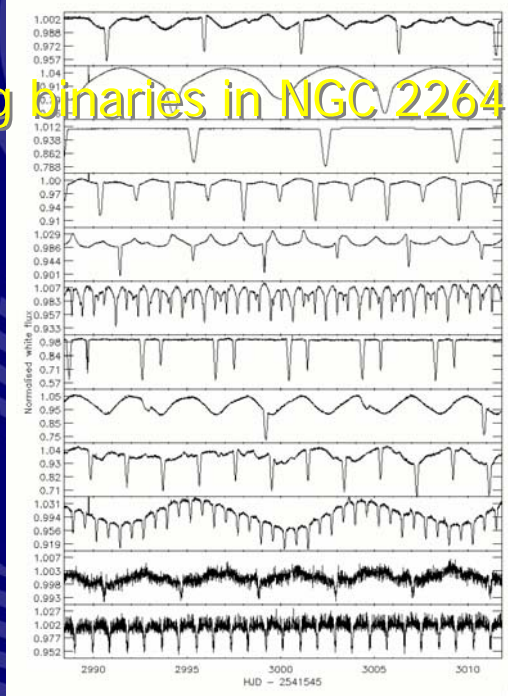
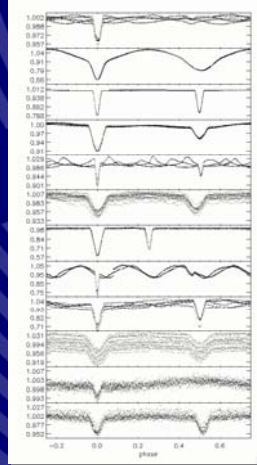
## Occultations and transits

- PMS eclipsing binaries still rare and precious
  - Essential test systems for PMS stellar structure and evolution models!
- Planets around young stars would be real bonus!



Few known systems point to weaknesses in existing models

# Candidate eclipsing binaries in NGC 2264



Lots of candidates, identification, confirmation ongoing – very promising, see Suzanne's poster



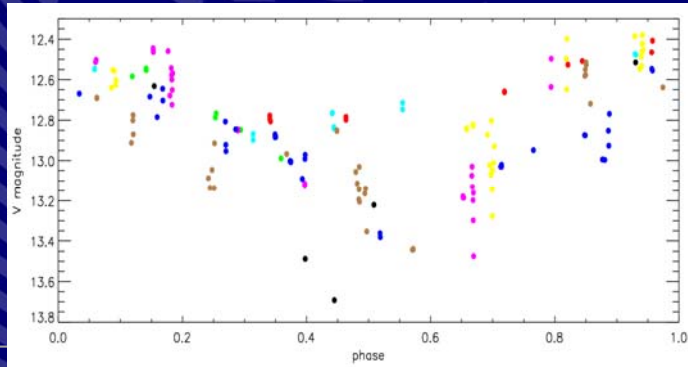
## Accretion processes in young stars

- Photometric variability key tracer of accretion process
- Used with success in a number of systems already (e.g. AA Tau)
- Long-term, uninterrupted light curves from COROT unique

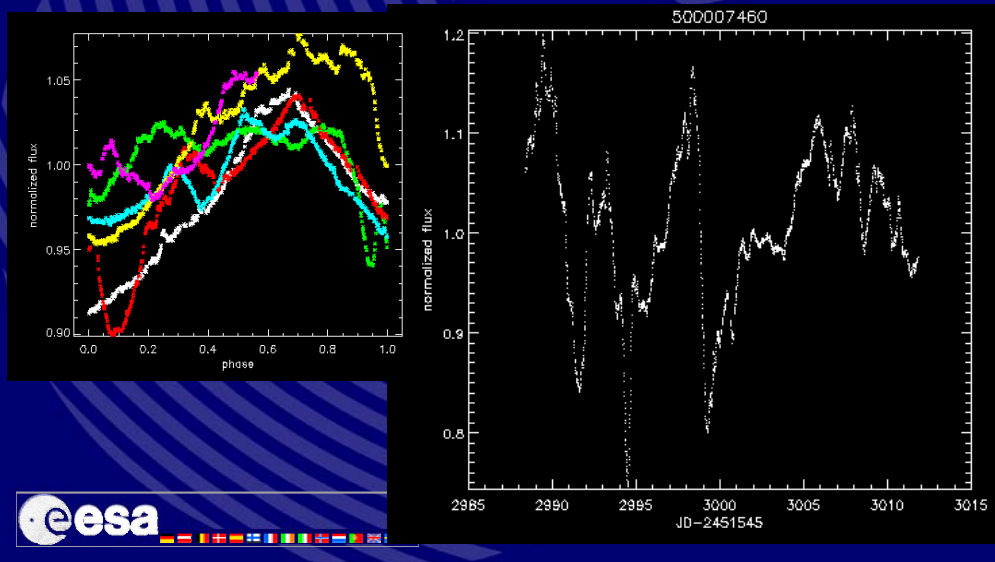


## Ground-based accretion signatures

- AA Tau, Bouvier et al. 2007
  - See S. Alencar's talk



## Accretion signatures in the COROT NGC 2264 observations



Detailed mapping of accreting structures possible

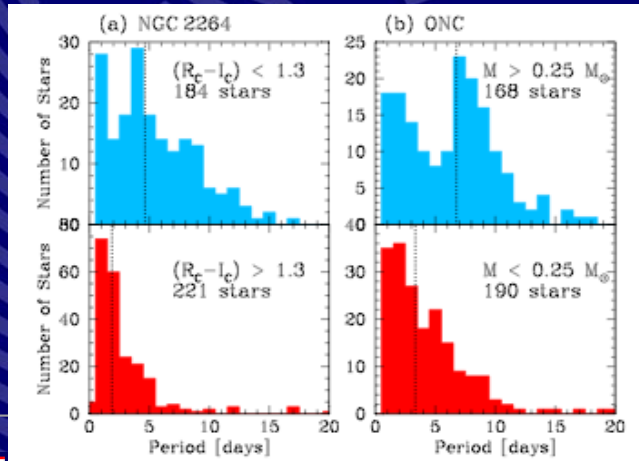
## Rotation period studies

- Angular momentum evolution key element in stellar structure evolution
- PMS phase critical
  - Disk coupling
  - CTTS vs. WTTS
- COROT offers unique chance to study complete range of periods

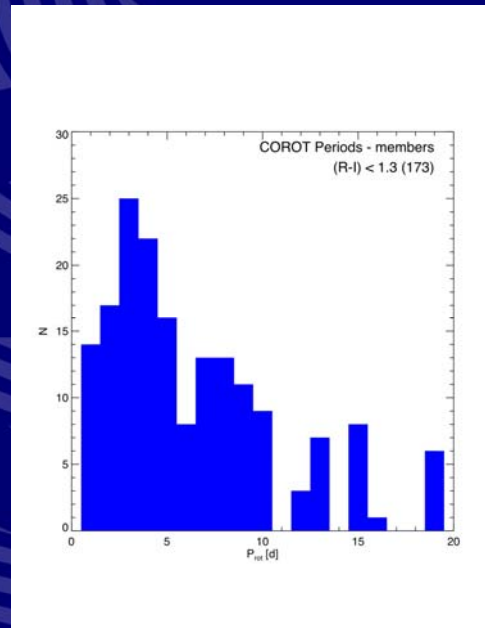
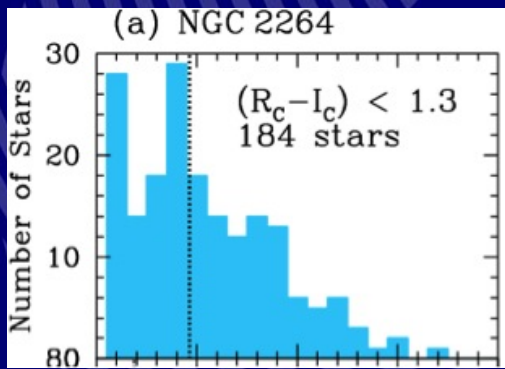


## Previous work

- Extensive studies of rotational periods in young clusters, SFR's, etc. performed from ground
- Lamm et al.

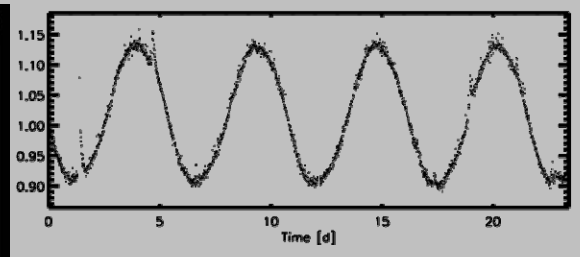
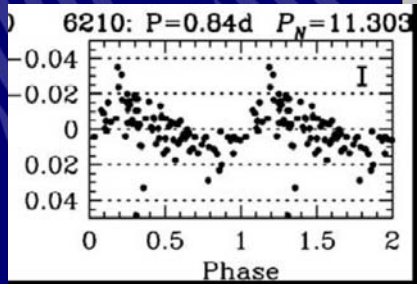


# COROT's results



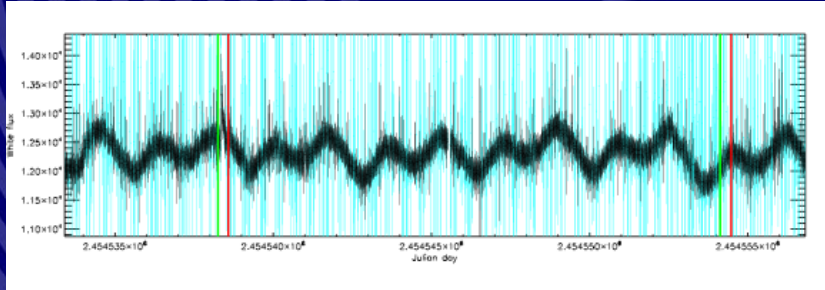
## Short periods impossible to sample from ground

- $P \approx 1$  d spurious
- No ambiguity in COROT's data



See L. Affer's poster for details. Again Lamm et al.

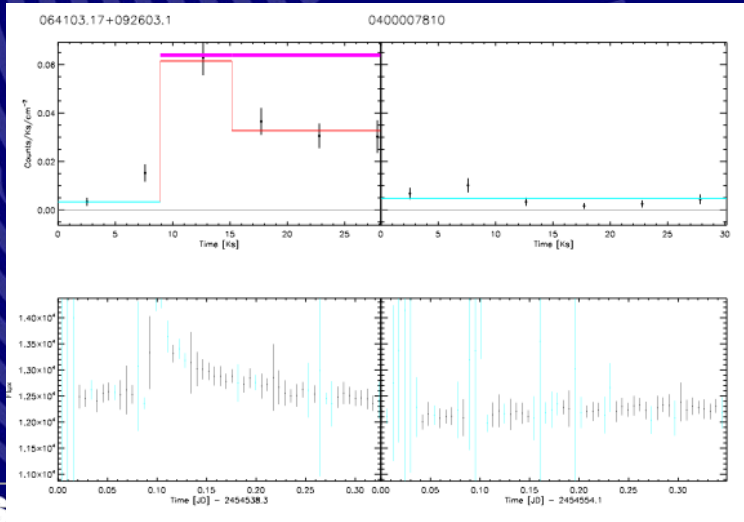
# Flaring



Explain red and green bars



# Flaring - 2



Chandra's simultaneous data

## Conclusions

- Unique opportunity
- Work in progress ... but
- Real treasure trove!





I thank you for your patience and attention! And I hope to have succeeded in giving you a by necessity shallow view of the exciting range of astronomical telescopes and instruments being flown and being built for the future by ESA!