FLUOR Instrumentation

by

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Short description of FLUOR

- FLUOR is a singlemode fibers recombiners
- Works in K-band (2 – 2.4 µm)

- Singlemode fibers:
  - Pupil phase corrugations → intensity fluctuations
  - Easier calibration
  - Piston not filtered

- 4 outputs
  - 2 photometric channels
  - 2 interferometric channels
Temporal relevance of FLUOR

- Complementarity FLUOR and other CHARA instruments
- What is the niche of FLUOR?

<table>
<thead>
<tr>
<th>Imagery</th>
<th>Visible</th>
<th>near-IR</th>
<th>mid-IR</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPOI</td>
<td>VLTI/Amber</td>
<td>CHARA/MIRC, MROI, VLTI/Gravity</td>
<td></td>
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<tr>
<td></td>
<td>CHARA/VEGA</td>
<td>CHARA/FLUOR</td>
<td>LBT/Nuller, Kech-I/Nuller</td>
</tr>
</tbody>
</table>

+ Maturity, accessibility, long baseline, data simplicity
Why JOUFLU?  
(Rejuvenation and upgrading of FLUOR)

- FLUOR has not changed since IOTA
- We must adapt FLUOR to the environment

CHARA
- Being able to follow evolution of CHARA
- Being able to connect to other subsystem (VEGA, CHAMP)

- Remote observing on a routine basis
Increase dynamic

- Current dynamic is around 300
- Dynamic is limited by some bias:
  - Piston
  - Chromatic bias
  - Number of scans
  - ...
- Solutions:
  - Fringe tracking
  - Spectral dispersion
  - Faster observation sequences

Mérand et al. 2006, A&A 453, 155
Spectral resolution

• Implement spectral resolution : 2 options
  – Prism
  – Double Fourier mode

• What it implies ?
  – Greater coherence length → change fast scan
  – Need phase stability → CHAMP connection
FT from CHAMP

• We need to stabilize fringes
  – Long exposure
  – Reduce phase error
  – No piston for double fourier interferometry

→ Increase spatial and spectral resolution

• Idea : Use CHAMP

• Is it possible that CHAMP work with only 2 telescopes ?
Remote mode, automatisation

- Automatisation of ALIU (Alignment procedure)

  2 goals:
  - Limit number of intervention in the lab.
  - Implement remote mode
Pupil from VEGA

- New in ALIU : Alignment of pupils
- Why ? CHARA's pupil move during the night → Flux can fall suddenly
- Problem : FLUOR cannot image the pupil
- Idea : Use pupil location system of VEGA
New control system

Current system

Mac G4

Intranet

Mac G3

Serie

PC/DOS

Serie

Camera

Lab.

Fast-scan

Motors

New system

Mac G4 or other

VPN

PC/Linux

Serie

CHARA

CaLI

Lab.

Fast-scan

Motors

Control room

Control room/Meudon

Internet

ROM
Take home message

• Increase dynamic from 300 to higher as possible
  - Spectral resolution
  - Fringe tracking (CHAMP)

• Connect with VEGA
  - Imaging pupil
  - Simultaneous multicolor observations with VEGA

• Automatisation of alignment procedure
  - Remote mode

• New control system
  - Follow evolution of CHARA
  - Connect to CHAMP, VEGA...