Stellar surface imaging with VLTI

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Abstract: We intend to study stellar magnetic activity by detecting starspots directly with AMBER at VLTI.

Scientific background

Why observe?

- Starspot allow to study the dynamics of the photosphere (differential rotation, evolution of surface)
- Nature of spots give constraints on stellar interior models

Why VLTI?

- vsini too low for Doppler-imaging (should be >25km/s)
- Photometric methods don't allow us to derive exact spot parameters
- Long-baseline interferometry is the only tool for direct imaging

Observations

- α ~ 9 h; δ ~ -43.5°
- m_{κ} =-1*mag*, angular diameter: 13*mas*
- Rotational period >600d (Hipparcos photometry)
- AT's (E0-G0-H0; D0-H0-G1; A0-K0-G1)
- AMBER (low resolution)
- Date: January March 2009, 3 nights
- Seeing <1.4 as, clear sky</p>
- Calibrator: HD 78959

Simulated uv-space



What we expect

 There are measurable differences between spotted and unspotted star model, both in visibility and closure phases



unspotted

spotted

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unspotted

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Other scenarios

Small and unresolved spots

Spots distribution is almost uniform