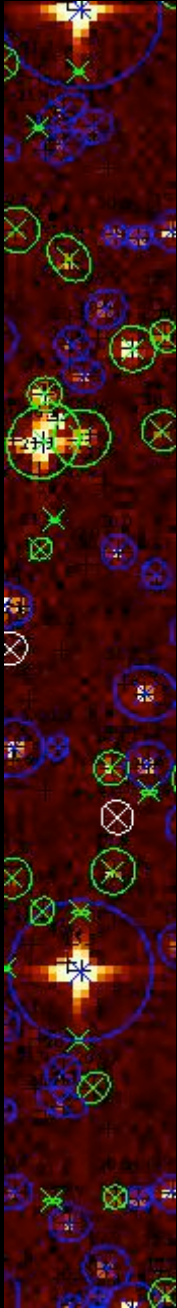# Detection performances for DMS
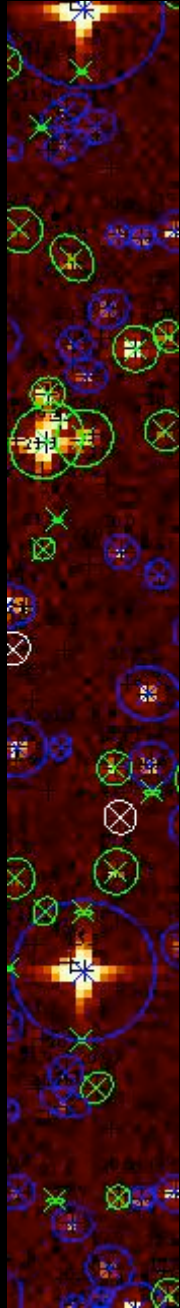
Shan Mignot
Observatoire de Paris-Meudon

Outline

- Observation prerequisites

- Detection methodology (GD)

  principles

  compound objects

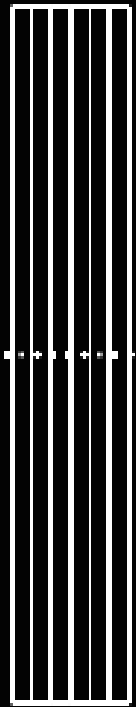 false detections

- Performances
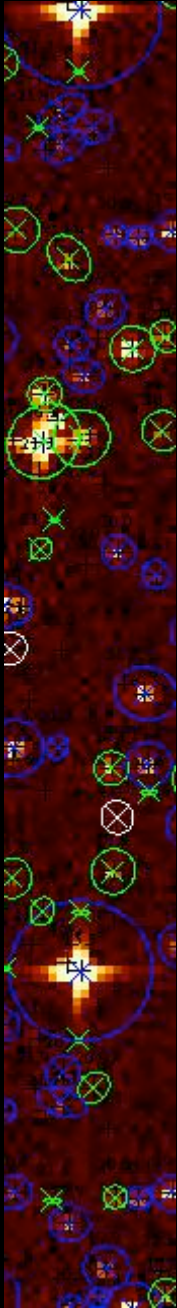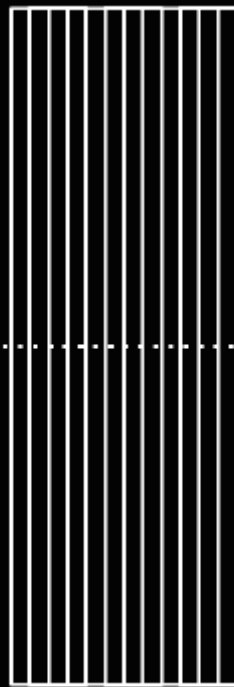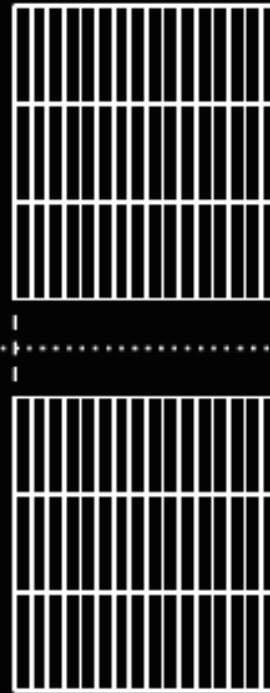
  detection

  DMS

Observation Prerequisites

Windows

- Windowed observations in AF1-11 & BBP1-5

16-20   12-16   8-12   2-8

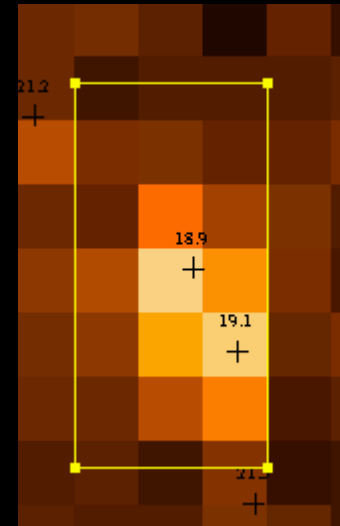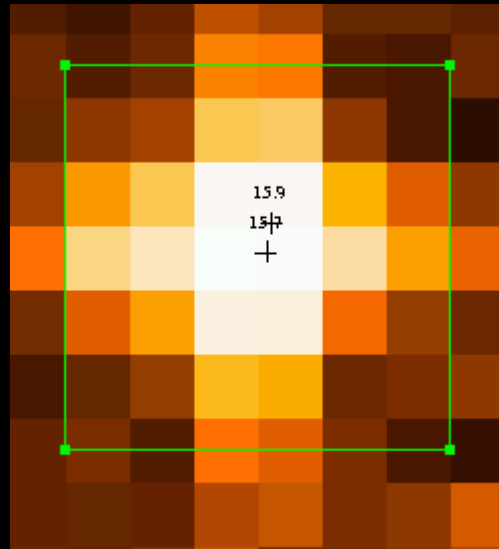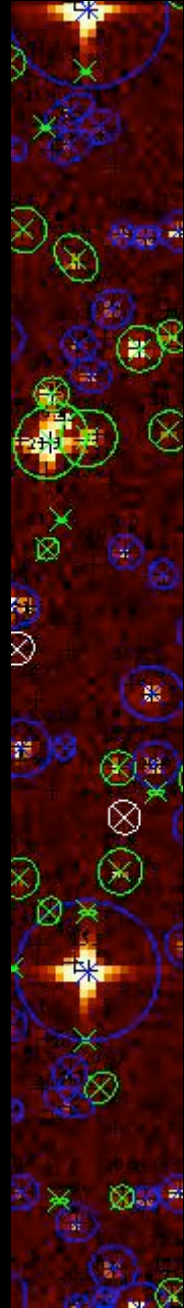Detection performances for DMS - Shan Mignot - Turin March 2003
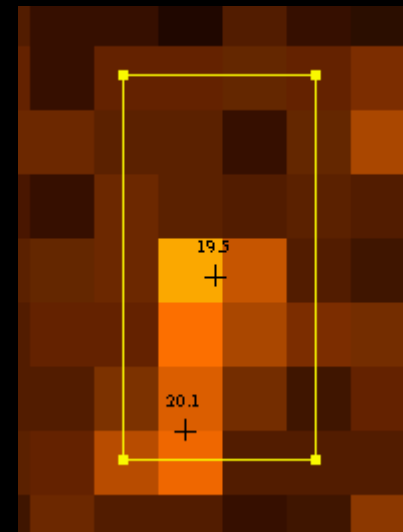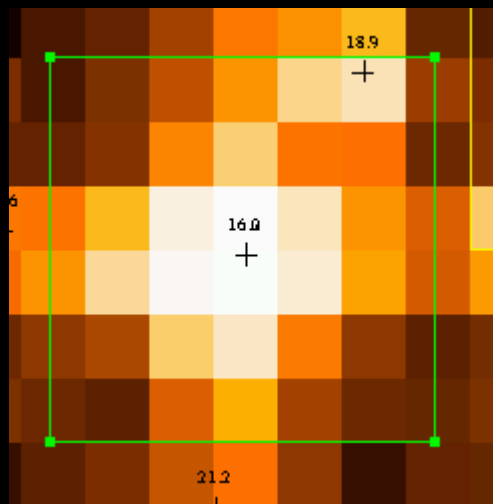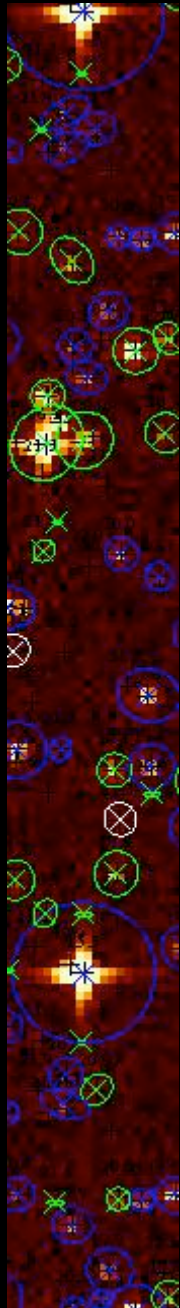
Detection Methodology

Detection (GD overview)

- Buffering

- Denoising

- Background estimates

- Detection of sources

- Deblending

- Measurements

- Classification

- 32-line-wide regions

- linear filtering (smoothing)
- SNR-thresholding

- trimmed median & bilinear interpolation

- connected-component based

- maximum-based domains of influence
- pre-processing step to reject false detections

- centroiding, flux, geometry, flux

- type determination for subsequent processing

Detection models

- Connected components of relevant samples
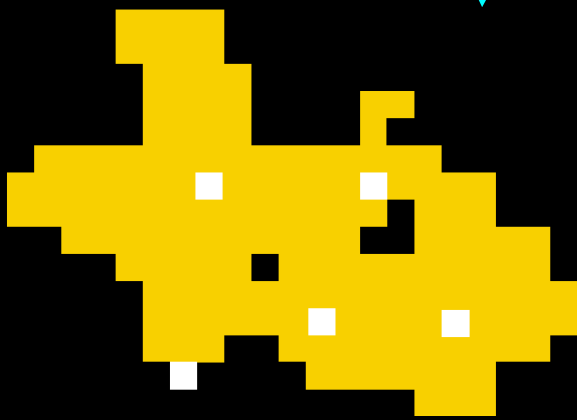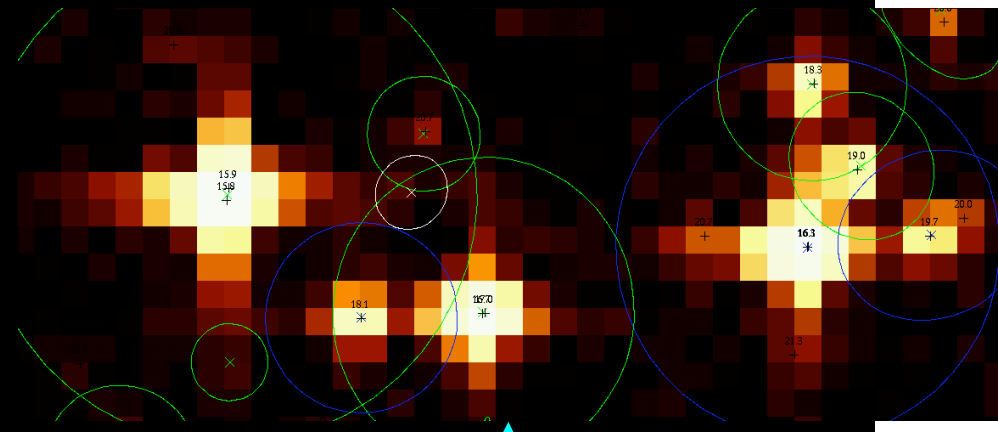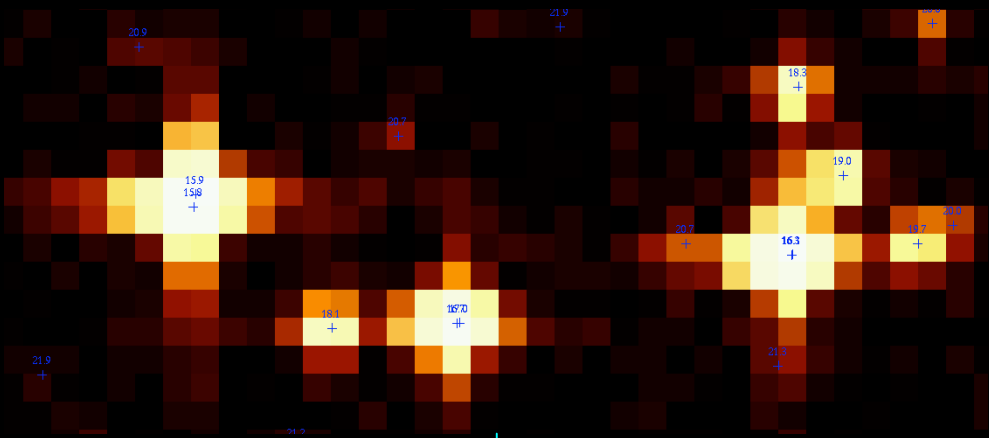   - filtering on overall detection signal
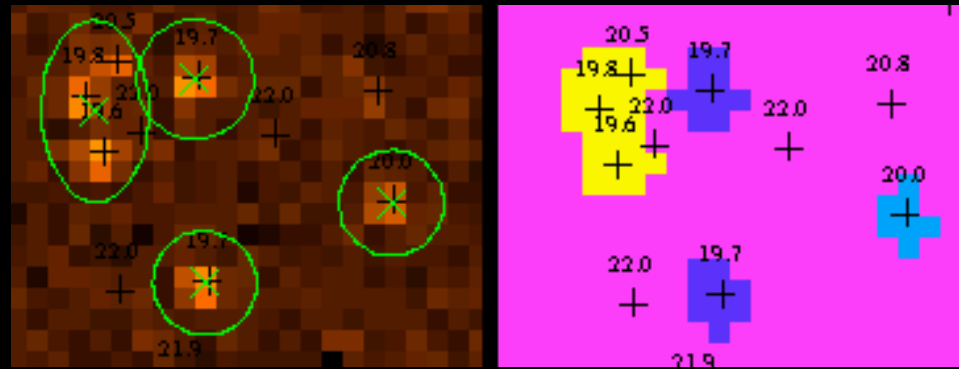
- Sample domains around local maxima
    - correspondence: 1 max ⇔ 1 object
    - raw data (smoothing)
    - domains separated by "valley lines"

Detection performances for DMS - Shan Mignot - Turin March 2003
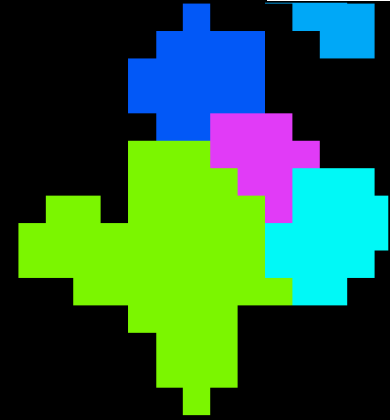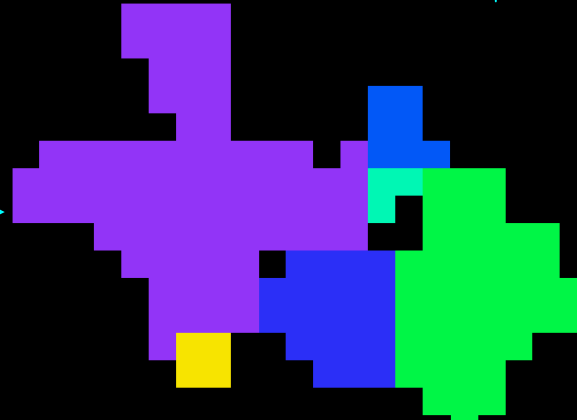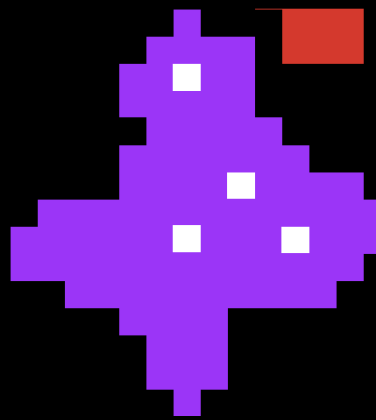
False detections

- ## False detections' sources:

  - noise

  - cosmic rays (not simulated yet)

  - bright stars' spikes (PSFs rebounds)

- ## Preprocessing step: filter the maxima

  - according to alignment

  - according to value
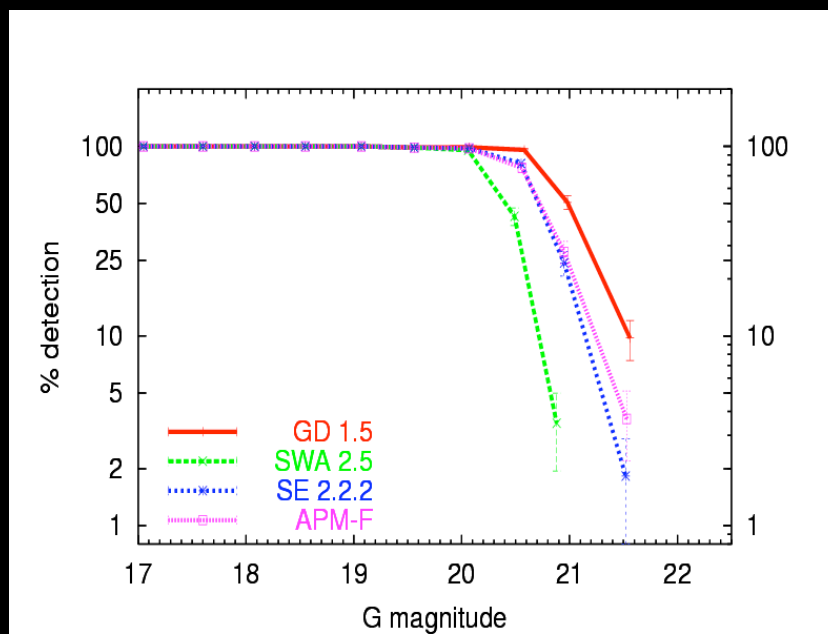
  - according to separation
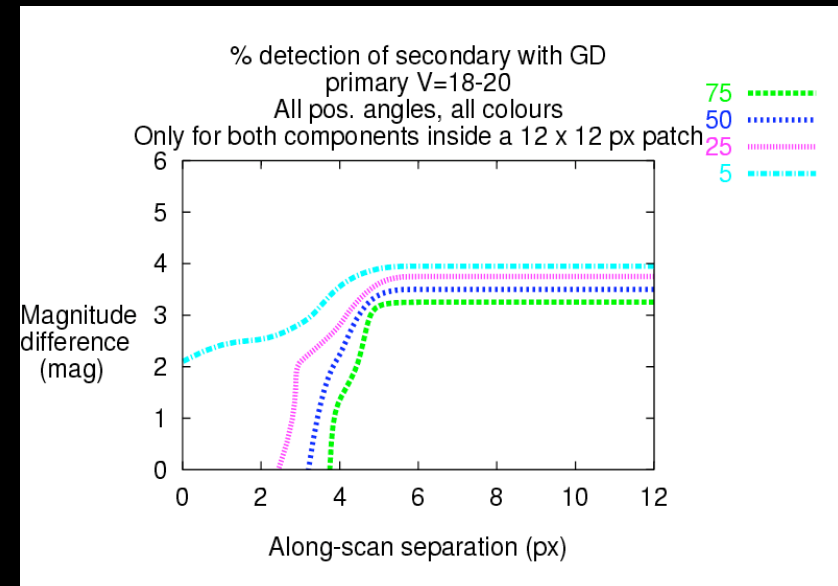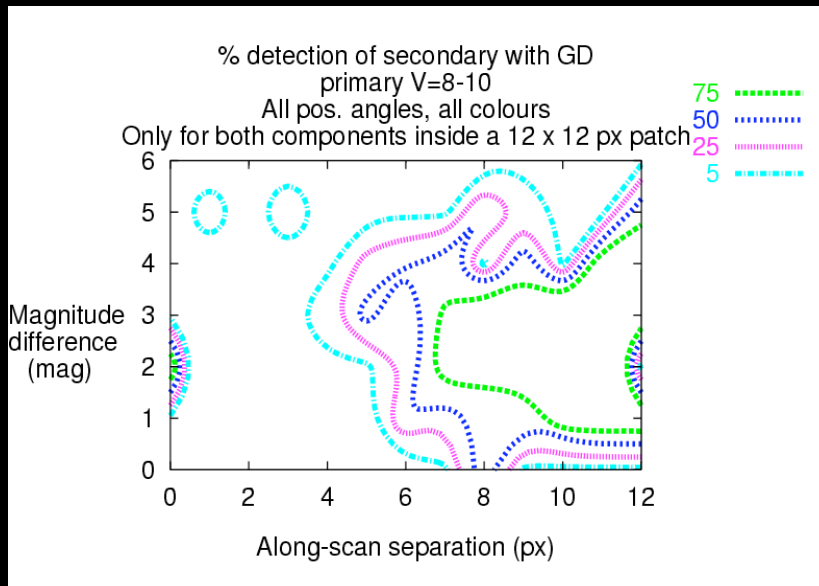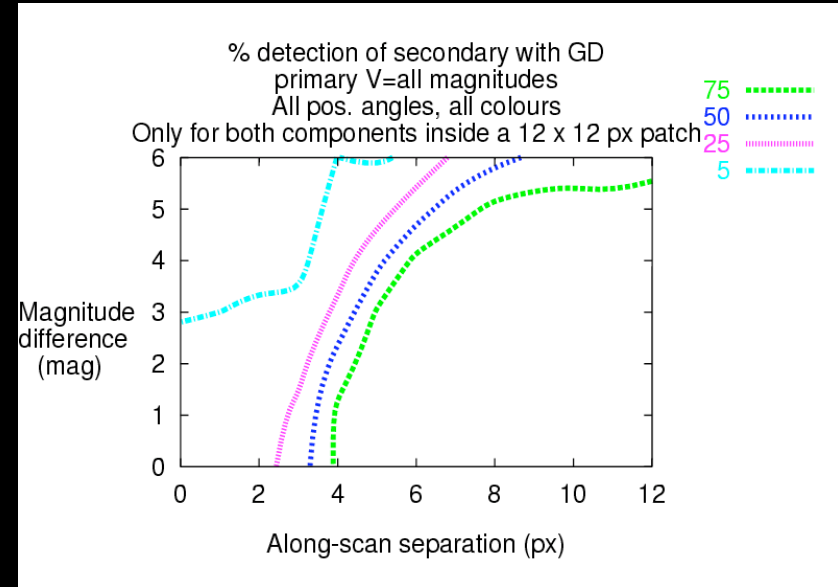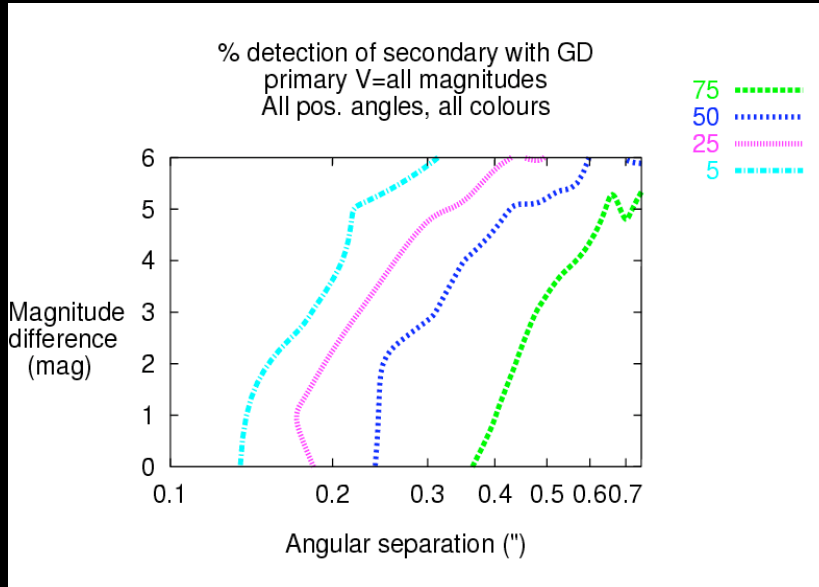
(11.9 & 12.3)
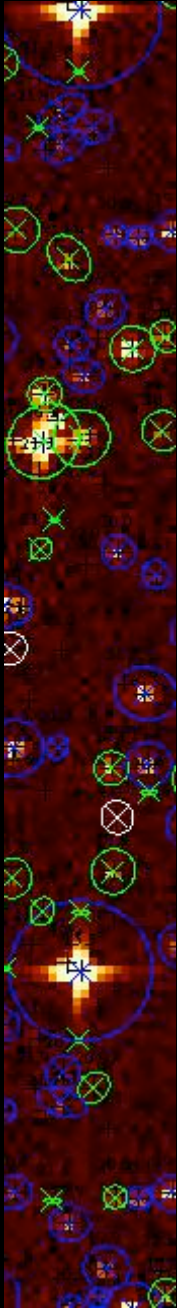
Performances

Completeness

- ## Comparison with
  - SWA (Sliding Window Algorithm C. Babusiaux, E. Høg)
  - APM (M. Irwin)
  - Sextractor (E. Bertin)

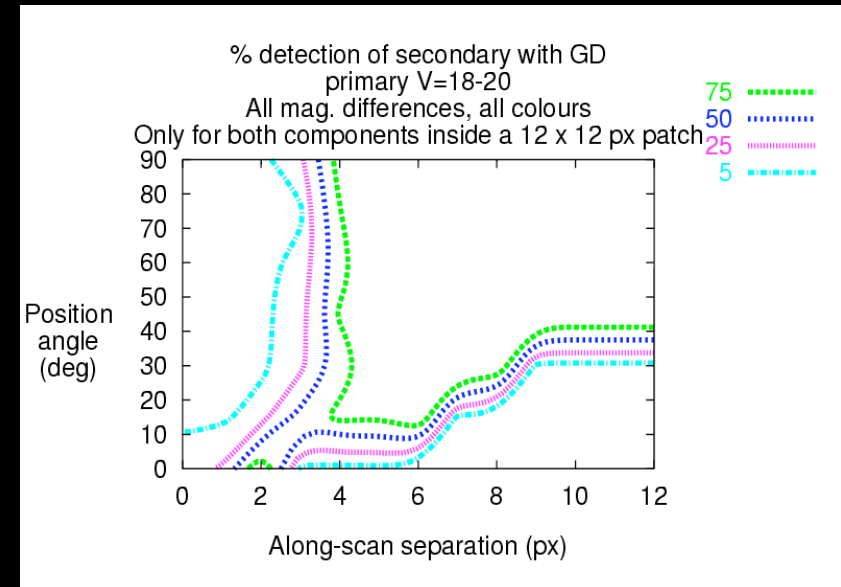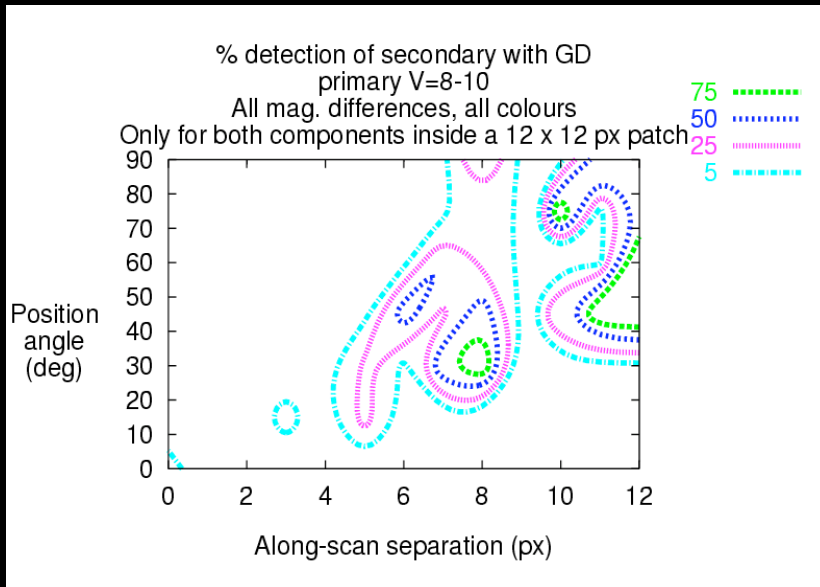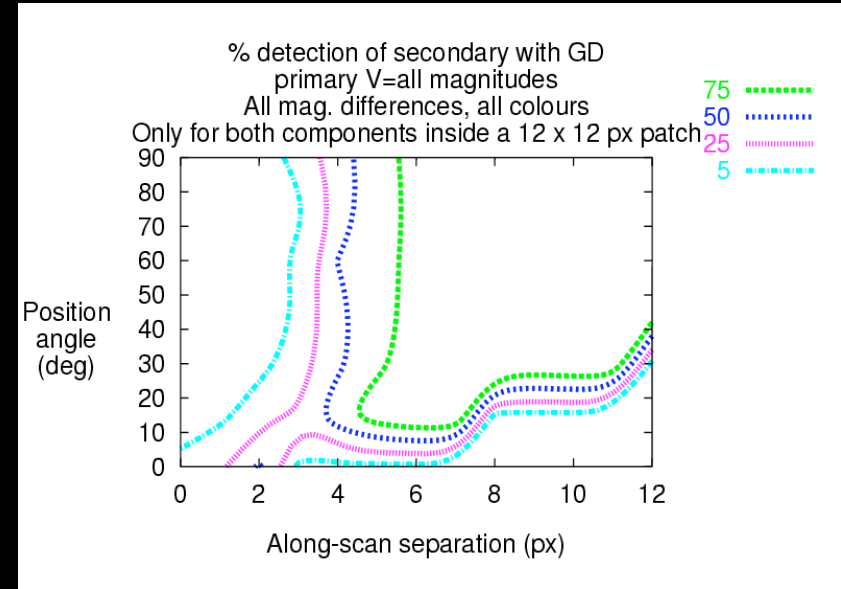- ## Overall detection reliability (completeness)

Magnitude difference

Orientation

Detection performances for DMS - Shan Mignot - Turin March 2003
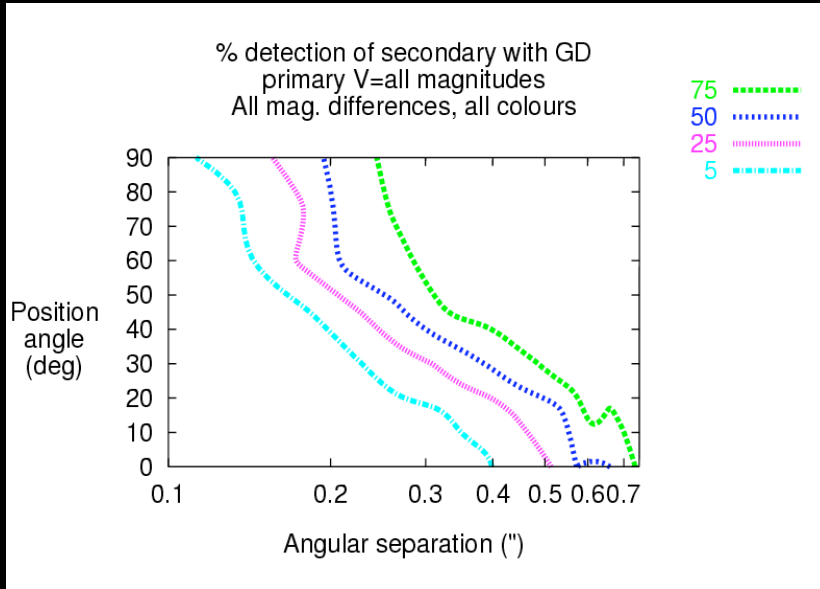
Impact of false detections
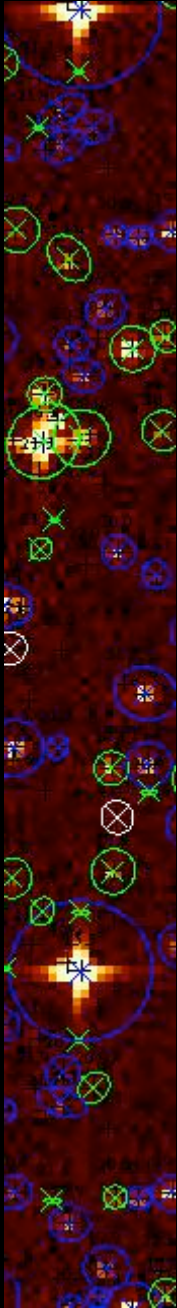
no filtering

filtering

Color

% detection of secondary with GD
primary V=all magnitudes
All pos. angles, all mag. diff.

75 ━━━━━
50 ┅┅┅┅┅
25 ┉┉┉┉┉
5 ━·━·━

Secondary V-I (mag)

Angular separation (")

% detection of secondary with GD
primary V=all magnitudes
All pos. angles, all mag. diff.
Only for both components inside a 12 x 12 px patch

75 ━━━━━
50 ┅┅┅┅┅
25 ┉┉┉┉┉
5 ━·━·━

Secondary V-I (mag)

Along-scan separation (px)

% detection of secondary with GD
primary V=18-20
All pos. angles, all mag. diff.
Only for both components inside a 12 x 12 px patch

75 ━━━━━
50 ┅┅┅┅┅
25 ┉┉┉┉┉
5 ━·━·━

Secondary V-I (mag)

Along-scan separation (px)

Perspectives

- Separation of saturated DMS (according to geometry)

- Improved rejection of false detections (post-processing step)

- Handling of cosmic ray impacts

- Development of robust measurement methods for truncated objects