PRETI : ISOCAM FAINT SOURCES DETECTION

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The ISOCAM infrared camera is one of the four instruments on-board ISO. This detector, as all detector of its category, was affected by two defaults:

- Cosmic rays hit the detector with a frequency about one per image, creating false sources.
- The detector exhibited a transient behavior.

Usually one observation with ISOCAM is a set of different pointings on the sky, combined to make a mosaic or raster image. For each pointing several images are obtained to get rid of transient effects and cosmic glitches.

The main difficulty in dealing with ISOCAM faint source detection is the combination of the cosmic ray impacts (glitches) and the transient behavior of the detectors. Indeed, for glitches producing a single fast increase and decrease of the signal, a simple median filtering allows a fairly good deglitching, while for other glitches, memory effects can produce false detections. Consequently, the major source of errors here is not the detection limit of the instrument, which is quite low, but the large number of glitches which create false detections. Detection has to be done in the cube of data and not on the final raster image.

Three types of glitches can be distinguished, and one can last as long as a source, so that a simple object reconstruction from the detected structures in the wavelet space will produce poor results because of the strong confusion between the objects.

A solution for limiting the confusion is to use the knowledge we have about the objects. The problem of unknown object reconstruction is reduced to a pattern recognition problem. We search only for objects which verify given conditions. For example, finding glitches of the first type is equivalent to finding objects which are positive, strong, and with a temporal size lower than that of the sources.

The concept of **pattern recognition** using a multiresolution algorithm leads to an efficient calibration procedure, free of the major problems described above.