Título/Title:
Detection of strongly lensed galaxies using Herschel

Orientador/Supervisor:
Ciro Pappalardo (IA-Lisboa) ciro@oal.ul.pt

Descrição/Description:
The formation and evolution of galaxies along the Universe history is a key subject of current astrophysical research. In order to better understand the physical processes shaping this evolution, observations at different wavelengths are continuously pushing our limits, striving to reveal more and more distant and faint galaxies.
A well established method is based on the assumption that galaxies detected at sub-mm wavelengths are not expected to be brighter than 100 milliJansky at a wavelength of 500 microns, unless they are magnified by a gravitational lens. This means that the selection of sources with flux densities higher than this threshold, among those detected in the 500-micron channel of the SPIRE instrument on board of the Herschel Observatory, is an extremely efficient criterion to discover gravitationally lensed sub-millimeter galaxies (SMGs). A consistent fraction of these sources are predicted to be 'contaminants', i.e. galaxy of other types not related to the lens mechanism. However, these contaminants are easily identified using auxiliary data at others wavelengths. Once removed such galaxies, we end up with a catalog of lensed SMGs that would have remained completely unnoticed through other selection criteria.
Obviously, to confirm the presence of a lensed galaxy we will need follow-up at different wavelengths. However, Far Infra Red data of the Herschel telescope are publicly available, and the investigation of such sources offers interesting perspectives. For example, multi wavelengths analysis will allow the determination of the type of galaxies that produce such a strong observed emission, a problem quite controversial. The student will face to these problems in a brand new method developed on behalf of a collaboration between Portugal and France, hunting for these high redshift sources, and producing a catalog of candidates that will shed light on the earliest phase of the Universe.