Título/Title:
Detection of strongly lensed galaxies using Herschel

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Descrição/Description:
The formation and evolution of galaxies is a key subject in current astrophysical research. While the overall scenario outlining how galaxies emerged and developed throughout cosmic history is believed to be fairly well understood, most of the details of the physical processes at work remain unclear. In order to better understand these details, observations at many wavelengths are continuously pushed to their very limits, striving to reveal more and more distant and faint galaxies and to determine their properties.

A method presented in different studies stated that SMGs are not expected to be brighter than 100 milliJansky at a wavelength of 500 microns unless they are magnified by a gravitational lens. Selecting all the sources with a flux higher than this threshold, among those detected in the 500-micron channel of the SPIRE instrument on board Herschel, is an extremely efficient criterion to discover gravitationally lensed SMGs. A good fraction of the sources detected in this way are predicted to be 'contaminants' – other galaxy-types that are not interesting in this context – but these are rather straightforward to identify through comparison with auxiliary data, leaving astronomers with a catalogue of lensed SMGs that would have remained completely unnoticed through other selection criteria.

This result showed that a useful criterion to select strongly lensed galaxies is to consider sources with surface brightness above 100 mJy at 500 micron. Obviously to confirm the presence of a lensed galaxies we will need a follow-up at different wavelengths. However, since the topic is at the beginning and we have already the catalogue of both Virgo and Fornax at 500 micron, the investigation of such sources offer interesting perspectives. For example, multi wavelengths analysis will allow the determination of the kind of galaxies that produce the strong observed emission, a problem already quite controversial. The student will face to these problems in a brand new method developed on behalf of a collaboration between Portugal and France.