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por

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RESOLVING THE COSMIC INFRARED BACKGROUND WITH THE *HERSCHEL* SPACE OBSERVATORY

and

DUST DESTRUCTION BY RADIO JETS

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Abstract

During the last decades, infrared astronomy has changed our view about the evolution of galaxies, especially revealing that at large distances (z >1) individual galaxies are typically Ultraluminous Infrared Galaxies (ULIRGs, $10^{12} < L_{bol} < 10^{13} L_{\odot}$). Currently, we have access to large variety of physical information based on the emission in the infrared (IR) bands, radiation that in the case of galaxies mostly comes from dust grains.

However, diffraction limits of the infrared instruments and the existence of a large number of sources makes individualization of galaxies a difficult task. The first part of this thesis is entitled *Resolving the Cosmic Infrared Background with the Herschel Space Observatory* where, by the use of far-infrared realistic simulations of the deepest infrared images of the Universe, we have studied the origin of the confusion noise in the GOODS-Herschel images and resolved a substantive part of the Cosmic Infrared Background into individual galaxies. New techniques were developed to predict the fluxes in the far-infrared from prior knowledge in the mid-infrared. Mock images were built using those predicted fluxes to evaluate the role of local confusion noise and identify individual sources.

The second part of the thesis concerns the study of the *Destruction of dust grains by radio jets*, a project concentrating on Seyferts and ULIRGs that aims to better understand the life-cycle of dust studying the destruction of grains in galactic nuclei and the effects of their activity in the interstellar medium, in particular in the mechanism that gives rise to the narrow-line region in Seyfert galaxies. Long-slit near-Infrared spectra of a set of type-2 Seyfert galaxies were taken to measure diagnostic emission lines ([Fe II], [P II] and Paβ) that reveal the destruction of dust grains due to the shock waves produced by the radio jets. We found that the dominant mechanism of ionization close to the nuclei of the Seyfert galaxies is the radiation field produced by the back hole activity. In the outer part of the narrow-line region, shock waves induced by the radio jets also contribute to the energy budget of the interstellar medium and sputter the dust grains.

This was a co-advising thesis performed in the Service d'Astrophysique CEA-Saclay and the Astronomy Department of the University of Concepción, Chile.