

Detection of CFIRB with ASTRO-F/FIS Deep Observations

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The Far-Infrared Surveyor (FIS) is one of the focal-plane instruments on the ASTRO-F satellite, which will be launched in early 2006. Based upon source distribution models assuming three different cosmological evolutionary scenarios (no evolution, weak evolution and strong evolution), an extensive model for diffuse emission from infrared cirrus, and the instrumental noise, we present a comprehensive analysis for the determination of the confusion levels for far-infrared observations. We use our derived sensitivities to suggest best observational strategies for ASTRO-F/FIS mission. We estimate detection limits of 6.4 - 17 mJy and 34 - 88 mJy at 75 μm and 140 μm for ASTRO-F/FIS mission in low cirrus regions by taking both sky and source confusion noises. If the source distribution follows the evolution models, it will be mostly limited by source confusion. Finally, we predict the Cosmic Far-Infrared Background (CFIRB) which includes the information about the number and distribution of contributing sources. We find that we can detect CFIRB fluctuations which gives information about the discrimination of evolutionary scenarios of galaxies in most of low-to-medium cirrus regions.