[GC01] The Expected Color Segregations with AKARI Observations

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The Far-Infrared Surveyor (FIS) is one of the focal-plane instruments on the AKARI (formerly known as ASTRO-F) satellite, which was successfully launched on 22nd, February 2006. Using the observations with AKARI combined with our galaxy evolution scenarios and a detailed spectral library of galaxies, we will produce a new catalogue which will incorporate segregation of the extragalactic population into component types (Normal, star-forming, AGN) via color cuts utilizing the AKARI wavebands. From our simulation by using the type dependent luminosity functions and various templates of SED (Spectral Energy Distribution), we test the efficiency of determining the cosmological evolution of sources as a function of type as defined by galaxy colors. Based upon this study, we will constrain the evolutionary history for the well-studied galaxy populations as well as other (rarer) galaxy populations.

[GC02] An infrared study of Lyman Break Galaxies in Spitzer First Look Survey

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Massive high-redshift galaxies are important to constrain mass assembly history of the universe. Lyman Break Galaxies have been the most numerous sample of high-redshift galaxies showing vigorous star formation activity. Previous studies using optical / near-infrared imaging and spectroscopy have possibilities to neglect old, dusty red stellar populations that could tell more about stellar mass and dust content of LBGs. To fully understand the nature of LBGs at $z\sim3$, we used mid-infrared imaging data of Spitzer First Look Survey. With use of u-band dropout technique, we select 941 LBG candidates ($R<24.5$ mag) in central 1deg2 of the FLS. 80% of $R<23.5$ mag galaxies are detected in IRAC 3.6μm and 4.5μm. IRAC-detected LBGs and IRAC-undetected LBGs do not show differences in optical properties, but the addition of mid-infrared flux suggests that they are intrinsically different populations. Most IRAC-detected galaxies are well-fitted with old (>500Myr) stellar populations plus smaller fraction of young star-forming populations including large amount of reddening ($E(B-V)>0.3$). The stellar masses of IRAC-detected LBGs are of order of $10^{11}M_{\odot}$, comparable with today's L* galaxies. The presence of a significant number of old, massive LBGs at $z>3$ appears to be in contrast to predictions made by simple hierarchical galaxy formation models. Our result may support the "downsizing" scenario of galaxy formation.