## A systematic study on dust in early-type galaxies

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Historically early-type galaxies (ETGs) are thought to be almost devoid of dust because their interstellar space is likely to be dominated by hot X-ray plasma, which provides harsh environments for survival of dust. In addition the bulk of stars in ETGs are uniformly old, which cannot efficiently replenish dust to the interstellar medium. However recent mid- and far-infrared (IR) observations, including Spitzer, AKARI, and Herschel, have confirmed that some ETGs contain an observable amount of dust, conflicting with the above expectation. Although some mechanisms for providing ETGs with dust are proposed, their origins are not fully understood.

With the AKARI mid- and far-IR all-sky surveys, we performed a systematic study of dust in ETGs in order to reveal their origins. We study a volume-limited (D<100 Mpc), unbiased sample of 7857 nearby ETGs, selected from the HyperLeda catalogue. For example, among the sample galaxies, 2703 and 1593 ETGs are significantly detected in the 90  $\mu$ m and 140  $\mu$ m bands, respectively. Combining the AKARI result with other wavelength data obtained by near-IR, CO and 5 GHz observations, the properties of dust in ETGs such as dust temperature, dust mass and the dust-to-gas mass ratio are investigated. We also discuss a possible connection between dust and nuclear activities in ETGs.