

A01r What Can We Learn from Multi-Wavelength Studies of “Red” Galaxies

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In recent years the observational horizon has expanded rapidly for discovering “red” populations of distant galaxies as Extremely Red Objects (EROs), Distant Red Galaxies (DRGs), BzK-selected galaxies, MIR-selected Galaxies, and Submillimeter Galaxies (SMGs). They seem to be in some early stages before evolving to present-day massive galaxies. In order to study the “red” galaxies, fortunately, we have been (will be) also able to access new generation detectors as MORICS/Subaru(NIR), IRC&FIS/AKARI(NIR – FIR), AzTEC/ASTE(Submm) and FMOS(NIR) even in Japan. The “redness” of their color, however, is caused mainly with two distinct factors: the optically-red and/or Near-Infrared (NIR) star-light from old populations in galaxies, and the reddening due to interstellar dust suffering even “blue” UV-optical light from young stars and re-emission in Mid/Far-Infrared (MIR/FIR) and/or Submillimeter (Submm) wavelength. While the former represents directly the color of the energy sources, the later veils those and the related physical processes. Both factors inducing the “redness” are mixed in most of “red” galaxies, which sometime induces the confusion in our understanding about the cosmic history of “red” galaxies. Thus, it is important to study these “red” galaxies with not only multi-wavelength detections in the NIR, MIR, FIR and Submm wavelengths, but also systematic and careful studies for their Spectroscopic Energy Distributions (SEDs). As an introduction in this section, I would like to talk how to extract the physical information from the SEDs of “red” galaxies and try to summarize our present understandings about their cosmic history.