

## X15a FOSSILS: Formation Of Sub-Structure In Luminous Submillimeter Galaxies

Ryota Ikeda, Daisuke Iono, Maximilien Franco, Ken-ichi Tadaki, Hidenobu Yajima, Min S. Yun, Jorge A. Zavala, Yuichi Matsuda, Ikki Mitsunashi, Andrea Silva, Takafumi Tsukui, Junko Ueda, and the FOSSILS team

Luminous submillimeter galaxies (SMGs) are the most likely ancestors of massive galaxies that dominate the central potential of clusters we see today. Mergers or large-scale gas inflow in isolated disks are possible scenarios explaining the observed large star formation rate, but the exact triggering mechanism is under debate. In this talk, we present FOSSILS, an ALMA survey to obtain the largest sample ( $N \gtrsim 30$ ) of unlensed luminous SMGs at 300-400 pc resolution ( $\theta \sim 0.06''$ ) in FIR continuum. The survey allows us to study the morphologies of star formation in detail with a statistical sample for the first time. Furthermore, we present a detailed study on three luminous SMGs ( $f_{870\mu\text{m}} > 10 \text{ mJy}$ ) previously reported in Iono et al. (2016), in which all of them have resolved images of both ALMA and JWST/NIRCam, tracing star formation and stellar distributions, respectively. We find that while two of them show a disk-like structure in both components, one SMG exhibits clumpy star formation activity and highly concentrated stellar structure with the Sérsic index  $n = 5.4$ . Despite the small sample size, our pilot study suggests a dichotomy in the mechanisms triggering starburst: secular instability in gas-rich disks and efficient gas inflows induced by dissipative processes.