Dust-free Insight into the Obscured Cosmic Accretion History and Modes of Galaxy Assembly

The support from this program has enabled successful analysis and dissemination of results from the most sensitive astronomical survey at radio frequencies ever conducted. We used the Very Large Array radio observatory to conduct 2 - 8 GHz imaging of the Hubble Ultra-Deep Field at the sensitivities required to capture star-forming galaxies at z ~ 1-3, the peak epoch of galaxy assembly. We found that (1) the typical morphology of star formation (SF) in rapidly assembling galaxies at redshift z ~ 2 to be disk-wide, consistent with the scenario that galaxies assemble most of their stellar mass via accretion of cold gas, which leads to gas-rich, unstable disks and in-situ disk-wide star formation; and that (2) the active galactic nuclei (AGN) and SF are co-spatial at z ~ 3, consistent with a picture of in-situ galactic bulge and MBH growth. The program has spurred multiple new observing campaigns to definitively characterize the SF morphologies and the co-spatial nature of SF and AGN.

Research fields: Astronomy

Keywords: Gas accretion, galaxy formation, galaxy evolution, star formation, active galactic nuclei, SF - AGN coevolution
1. 研究開始当初の背景

この研究が行われた背景は、以下のように考えられます。研究開始当初の背景

2. 研究の目的

この研究の目的は以下の通りです。研究の目的について

3. 研究の方法

研究の方法については以下の通りです。研究の方法について

4. 研究成果

研究の成果については以下の通りです。研究の成果について
and MBH growth, and may represent the dominant process regulating the bulge-MBH relationship through which all massive galaxies may pass.

The source catalog from our VLA survey, has been widely distributed among collaborators and have been published, in part, in the aforementioned journal papers. Most notably, the resulting radio data was also used by the James Webb Space Telescope (JWST) NIRCam and NIRSpec Guaranteed Time Observations (GTO) teams, which the PI is a member, to target the GTO observations when the JWST is launched in 2019. Future students (including students at the Kavli IPMU, where the PI remain affiliated as a visitor) will have access to GTO data from JWST.
Wiphu Rujopakarn, Probing the peak epoch of galaxy assembly with VLA and ALMA, Invited Colloquium, 19 January 2017, National Radio Astronomy Observatory, Charlottesville, USA