Probing Merging Galaxies and Active Galactic Nuclei

The research interests of our group are mainly on merging galaxies and active galactic nuclei. Galaxy interaction and merging play an essential role in galaxy formation and evolution. According to the hierarchical scenario of galaxy formation, large galaxies are built up by mergers of small galaxies. Merging galaxies are also suggested to be related to star-forming galaxies and active galactic nuclei (AGNs). It is well known that galaxy interactions can trigger enhanced star formation activity; non-axisymmetric structure arising from galaxy interactions produce gravitational tidal torques, which induce strong gas inflows and transfer the angular momentum of the gas outward. Consequently, starburst activities could be triggered by inflowing gas in the central region of galaxies. Galaxy interaction could also allow the inflowing gas to fuel the central massive black hole and evolve to AGNs. On the other hand, the properties of circum-nuclear molecular gas (CMG) near an AGN can be influenced by the AGN itself. X-ray photons from AGNs have greater penetration lengths and are more efficient in gas heating; furthermore, CMG can also be affected by mechanical processes, such as gas entrainment by jets. These effects might reduce the star formation efficiency of CMGs. The connection between AGNs and merging galaxies is still a puzzle. Students in our group will learn to use ALMA and other instruments to investigate the connection between merging galaxies and AGNs.