Title

Antennae Galaxies

Abstract

Galaxy collisions are crucial for triggering active star formation and the evolution of galaxies. Most of the colliding galaxies are distant. Thus, investigating the detailed properties of the interstellar medium (ISM) in colliding galaxies is challenging. Recently, the advent of high spatial resolution of ALMA enables us to reveal that in the nearest colliding galaxies, the Antennae Galaxies, high-density molecular clouds collide on scales of several hundred pc, triggering stellar cluster formation. The last piece in understanding the star formation mechanism triggered by galaxy collisions is elucidating the physical relationship between galaxy collisions and molecular cloud collisions. To connect these phenomena, observations of HI gas are essential. HI gas is the material for high-density molecular clouds and is significantly disturbed by galaxy collisions. Understanding the processes of molecular gas formation driven by colliding and infalling HI gases and subsequent molecular cloud collisions is necessary to comprehend star formation triggered by galaxy collisions. The previous HI observations, with spatial resolutions of several kpc and velocity resolutions of ·7 km/s, have yet to prove sufficient for examining the relation with colliding molecular clouds. This study aims to use MeerKAT to achieve spatial resolutions comparable to ALMA's molecular cloud observations (6" or 600 pc) and velocity resolutions of ~1 km/s. This will detect the clumpy cold HI associated with molecular cloud collisions for the first time.