

ALMA2019: Science Results and Cross-Facility Synergies



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High-resolution studies of the SZ effect

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Contributed talk

Abstract:

“In recent years, ALMA has allowed for probing the the Sunyaev-Zeldovich (SZ) effect at unprecedented sensitivity and angular resolution, thus opening a millimetre-wave window – complementary to X-ray observations – on the evolution of galaxy clusters and the physics of the intracluster medium. I will present recent results from high-resolution ALMA studies of the SZ effect from two of the most well-known galaxy clusters. First, I will discuss the analysis of the renowned galaxy cluster RX J1347.5-1145. We performed the reconstruction of the pressure distribution by jointly analysing a combination of ALMA, Bolocam, and Planck data. This offered the opportunity to test the power of a joint image-visibility analysis, as well as opening a new path for interpreting the cluster morphology and merger history. In particular, the combination with results from X-ray image arithmetic has shown that the excess observed southeast of the cluster cool core in X-ray surface brightness map may not be entirely due to adiabatically-compressed gas. Thus, the possibility of a merger scenario less dramatic or at a later merger stage than what has previously been derived is suggested. Then, I will present new results from the study of the ALMA observation of the shock front in the Bullet cluster. In particular, along with an independent view of X-ray observations on the basic shock properties, ALMA angular resolution is allowing for gaining fundamental insights into deviations from the ion-electron Coulomb equilibration.”

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