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Cecilia Bacchini - 3D modelling of the molecular gas kinematics in optically-selected jellyfish galaxies

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Cluster galaxies are subject to the ram pressure exerted by the intracluster medium, which can perturb or even strip away their gas while leaving the stars undisturbed. Interestingly, both observational and numerical studies find that the ram pressure, by compressing the gas disc, may drive gas inflows towards the galaxy center, possibly feeding the black hole activity. We study the distribution and kinematics of the molecular gas, traced by CO, in four late-type cluster galaxies observed with ALMA. These objects were selected as they show tails of atomic and ionized gas, which indicate ongoing ram pressure stripping. We modelled the CO emissione line datacubes using the software 3D-Barolo, searching for signatures of radial gas flows, ram pressure stripping, and other perturbations. We compare the results with the stellar kinematics extracted from MUSE@VLT observations, obtaining useful insights about the physical mechanisms affecting our galaxies. Overall, we find that the molecular gas is more resilient to ram pressure than the diffuse gas phases. Typically, the molecular gas kinematics is mainly dominated by bar perturbations and/or rotation, while the ram pressure becomes important at large galactocentric distances. Large-scale radial flows of molecular gas are present and consistent with bar-driven inflows or ram pressure-driven outflows. Despite all our galaxies host an AGN, no molecular gas outflow is clearly visible. The molecular gas velocity dispersion tends to be enhanced with respect to field galaxies, indicating strong turbulence. This can be due, either directly or indirectly, to the ram pressure, which can increase the gas turbulent energy and/or the star formation rate, enhancing the turbulence driven by supernova feedback.

Session Classification: Cosmology, high-z Universe, galaxy clusters