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The Virgo Environment Traced in CO Survey: How HI-identified environmental mechanisms affect the molecular gas in cluster galaxies

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Understanding galaxy formation and evolution is one of the key goals of astronomical research. With roughly half of the galaxies in the local Universe residing in dense environments, it is therefore important to study the effects of environment on galaxy evolution. It has been known for several decades that galaxy clusters harbour a relatively large fraction of early-type galaxies, suggesting that dense environments can cause the premature quenching of star formation. Several environmental processes have been suggested to contribute to this, such as ram pressure stripping, starvation, violent fly-bys, and tidal interactions. However, the relative importance of these mechanisms, and how exactly they lead to the quenching of star formation, is still very much a subject of study. Typically distributed in extended discs, atomic gas (HI) has long served as an excellent tracer for environmental processes. However, it is the molecular gas that is the direct fuel for star formation. Therefore, studying the (direct) effects of environment on the molecular gas in cluster galaxies is key to understanding galaxy evolution in such dense environments. In this talk I will discuss the first results from the ALMA large program "VERTICO: The Virgo Environment Traced in CO Survey". In particular, I will focus on how environmental mechanisms, identified using HI observations, affect the molecular gas in galaxies in the nearby Virgo cluster, by exploring resolved CO observations.

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