Impact of environment on galaxy morpho-dynamics at $z \sim 0.7$ as seen through the MAGIC survey

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During this presentation, I will discuss the key results from four morpho-dynamical analyses (Abril-Melgarejo et al., 2021, Mercier et al., 2022, Mercier et al., submitted., Mercier et al., in prep.) of intermediate redshift galaxies as a function of environment from the MAGIC survey (Epinat et al., in prep.). Specifically, I will show how we can probe the differential effect of dense galaxy groups on the galaxies' baryonic and dark matter (DM) contents and how this relates to their morphology, dynamics, star-formation activity, and angular momentum.

MAGIC is a deep MUSE-GTO survey targetting 15 galaxy groups in the COSMOS area. Thanks to the outstanding capabilities of MUSE, we have built a large sample of $\sim$ 1000 star-forming galaxies at $z < 1.5$, including both group and field galaxies in the mass range $M_\star \sim 10^8 - 10^{11}\,\mathrm{M}_\odot$. Thus, MAGIC is an ideal survey to probe in a self-consistent way the impact of the environment on spatially resolved morpho-dynamical properties of galaxies at intermediate redshift.

I will quickly mention the survey design and our sample selection. Then, I will discuss the joint morpho-dynamical modelling that we carried out on HST images and MUSE data-cubes. I will present our state-of-the-art mass modelling approach used to constrain the ionised gas kinematics and to precisely estimate the fraction of mass located in the DM halo.

In the second part of this presentation, I will highlight the main results for each analysis. I will discuss how we managed to precisely probe the effect of galaxy groups on the dynamics of galaxies as seen through the Tully-Fisher relation (TFR; Abril-Melgarejo et al., 2021, Mercier et al., 2022). More importantly, I will place these results in the context of the morphological and physical transition of galaxies in groups at $z \sim 0.7$ (baryon contraction and quenching) by discussing the observed co-impact of the environment on the size-mass and Main Sequence relations. In particular, I will discuss what these results mean in terms of group accretion history and effect of the environment on the baryonic and DM fractions.

Finally, I will present the main results of our two most recent analyses (Mercier et al., submitted, Mercier et al., in prep.). I will show that we observe a strong effect of the environment on the galaxies stellar angular momentum, with groups acting as catalysers for a depletion of angular momentum in some galaxies. Specifically, I will discuss two novel results that suggest a strong link between (i) the observed loss of angular momentum for galaxies in the groups, (ii) their dynamics in the groups and (iii) the dispersion of their gas component. I will conclude by discussing our current interpretation in terms of underlying gravitational and/or hydrodynamical physical processes that could be at the origin of such effects.