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Galactic gas outflows: from present surveys with VLT and JWST to the future with MOONS, 4MOST and the ELT

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"Recent JWST observations have revolutionised our ability to characterise the gas-phase metallicities and mass-metallicity relation (MZR) of low-mass galaxies (log(M⋆/M⊠) < 10) at z > 2. These results suggest that feedback-driven gas outflows play a crucial role in regulating star formation and ejecting metals from shallow potential wells at early cosmic epochs. This picture aligns with ΛCDM-based simulations, where galactic winds—driven by star formation and/or AGN activity—are key to reproducing observed scaling relations.
In this talk, I will present recent efforts to probe ionised gas outflows in the early universe using cutting-edge ground-based optical and IR instruments.
I will first highlight results from the KLEVER survey with VLT/KMOS, which targeted galaxies at z ≈ 2 and revealed that ionised outflows are common in massive AGN-host galaxies but surprisingly rare in low-mass systems. I will then introduce the GOLDEN (Gas Outflows in Lensed Dwarfs with ERIS and NIRISS) project, which combines gravitational lensed JWST imaging/spectroscopy and cutting-edge high-resolution VLT/ERIS data to resolve ionised gas outflow in dwarf galaxies (log(M⋆/M⊠) ≈ 7–9) at z ≈ 3.
Finally, I will discuss the key role of upcoming large optical and infrared spectroscopic galaxy surveys—MOONRISE and WAVES—planned with the new VLT/MOONS and VISTA/4MOST. I will conclude by highlighting the transformative potential of the ELT in resolving feedback and chemical enrichment processes in faint, low-mass galaxies at high redshift."

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Session Classification: Osservazioni da terra in ottico e infrarosso, presente e futuro: da VLT a ELT (chair: M. Dolci)