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Mass accretion in low-metallicity environments

Low-mass stars show evidence of disk mass accretion during their early pre-main sequence evolution. Mass accretion heavily affects the disk dissipation and depends on several properties, including environmental conditions, such as the metallicity. As a result, the mass accretion vs metallicity relation deeply influences planet formation, as testified by the observed correlation between planet occurrence and metallicity. Observational studies of young stellar populations in Galactic star forming regions (SFRs) at low metallicity through deep near-infrared images indicate that metal-poor stars dissolve their disks significantly faster than solar-metallicity young stellar objects (YSOs). On the other hand, other studies performed using HST photometry in young open clusters of the Magellanic Clouds, characterised by low metallicities, suggest that the mass accretion rate decreases more slowly with time than what is observed in solar-metallicity SFRs. A solid understanding of the effect of metallicity on the accretion properties of young disks can be obtained only through a detailed spectroscopic and photometric study on metal-poor YSOs, with the aim to measure mass accretion rates in complete samples and to compare the results with similar studies carried out in solar-metallicity environments.

Here, we illustrate how the unprecedented combination of high-spatial resolution and imaging/spectral capabilities of MAVIS will be ideal to observe large samples of YSOs in distant (d~4-5 kpc) metal-poor (Z=0.2 Zsun) star-forming regions of the outer Galaxy. This will allow us to derive the target accretion properties with the final aim to shed light on the role of metallicity on accretion efficiency, disk dispersal, and planetary formation.

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