Observations, simulations, and laboratory experiments: an interdisciplinary approach to study accretion impacts in young stars with disks

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Abstract

Young stars with disks are complex systems consisting of several components: star, disk, accretion columns, outflows, all contributing to the emission in different bands. The properties of these systems and the corresponding emission can be also important in the context of formation of stars and exo-planetary systems. A more complete description of the accretion phenomena characterizing young accreting stars is the interdisciplinary approach which combines multi-wavelength observations, magnetohydrodynamical models, and laboratory experiments (e.g. Revet, Chen, Bonito et al., Science Advances 2017). We will show the comparison between our magnetohydrodynamical models prediction and high energy observations (in the UV and X-ray bands) of TW Hya, a promising object to perform Doppler shift measurements with currently available instruments like Chandra. We will also discuss how future missions, as Athena and Large Synoptic Survey Telescope in different bands, will allow us to investigate in more details the accretion/ejection processes in young stars and their variability.