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Is there also a planet-metallicity correlation for young stars with protoplanetary disks?.

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Abstract

Metallicity is a stellar parameter that plays a fundamental role in planet formation. The well known planet-metallicity correlation for FGK stars tells us that the higher the metallicity of a star, the higher the likelihood that it harbors exoplanets. On the other hand, the situation in A-type stars is far from clear. Because of their higher rotational velocities and luminosities, the number of exoplanets discovered in these stars from the radial velocity and transit methods is actually very low, which makes a statistical study unfeasible. One way to potentially circumvent this problem is through the study of optically-visible intermediate-mass young objects surrounded by protoplanetary disks, so called "Herbig Ae/Be" stars. Although the detection of young planets embedded in protoplanetary disks is still a challenging task, the shape of the infrared spectral energy distributions reflects the properties of the disks and thus the potential presence of planets. Under this view, Kama et al. (2015, A&A 582, L10) hypothesized that the presence or absence of a Jupiter-like size exoplanet could explain the relation between the stellar metallicity and the shape of the spectral energy distributions that they found in a few Herbig Ae/Be stars.

In this poster, we expand the work carried out by Kama et al. (2015) by considering a significantly larger sample of stars. The spectra of 67 Herbig Ae/Be stars have been collected and their metallicities estimated by comparing them with Kurucz synthetic models. We confirm that there is indeed a correlation between the stellar metallicity and a specific shape of the spectral energy distributions suggestive of the presence of planets. This result may represent a major step forward in the field of planet formation and the evolution of protoplanetary disks.

My poster is available at https://zenodo.org/record/7024797#.Y5nDOXbMJEY