

# Mineralogical study of proto-planetary disks in FU Orionis stars

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**Abstract.** We report on mid-infrared (8–13  $\mu\text{m}$ ) spectroscopic observations of eight FU Orionis type objects and discuss a qualitative initial mineralogical analysis.

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## 1. Introduction

We carried out mid-infrared (8–13  $\mu\text{m}$ ) spectroscopic observations of eight FU Orionis type objects (FU Orionis, V1057 Cygni, V1515 Cygni, L1551 IRS5, RNO 1B/1C, OO Serpentis, PP 13S and ISO-ChaI 192) with the Gemini North and South Telescopes.

## 2. Results

We observe a predominance of silicates at 9.7  $\mu\text{m}$  in our sample. This feature appears in emission in V1057 Cyg, V1515 Cyg and FU Ori, and in absorption in the rest of the objects. However, most of the observed FU Orionis stars show evidence of dust grain processing in the mid-IR spectra, specially in emission: the broadening of the observed profile is indicative of grain growth and of the existence of crystalline compounds such as enstatite and forsterite. The only exception corresponds to PP 13S, the spectrum of which is well fitted by a dust composition of only olivine, demonstrating little or null grain processing in this disk.

V1057 Cyg and V1515 Cyg have low signal to noise spectra ( $S/N \sim 5$ ) and thus the presence of crystalline components is not certain. In the case of L1551 IRS 5 and ISO-ChaI 192, the peak of the absorption feature does not coincide with the peak of the coefficient of absorption of the olivine. The possible cause of this displacement might be the presence of pyroxens or olivines richer in iron, instead of the proposed pure olivine composition.

In general, Class I objects show emission features, while in Class II stars these features are observed in absorption. RNO 1B, classified as Class II, with an emission spectra, is the only exception. However this may be due to the inclination of the surrounding disk with respect to the line of sight (Polomski *et al.* 2005).

## References

Polomski, E. F., Woodward, C. E., Holmes, E. K., Butner, H. M., Lynch, D. K., Russell, R. W., Sitko, M. L., Wooden, D. H., Telesco, C. M., & Piña, R. 2005, *AJ* 129, 1035