

Presentation SF2A – July 2025
Théo Vrignaud.

Title: Exocomets in the Beta Pictoris system: results from new HST observations.

Abstract: Beta Pictoris is a young (20 Myr), nearby ($V = 3.86$) A5V star hosting one of the most iconic exoplanetary systems known to date. Its system includes an extended debris disc, two massive planets (β Pic b and c), and an exceptionally high number of exocomets detected in spectroscopy as they transit the star. All of this, combined with its proximity, makes β Pic a unique laboratory for studying the final stages of planetary formation.

In this talk, I will present recent progress in our understanding of exocomets, obtained using observations from the Hubble Space Telescope. Central to this is a new method - the exocomet curve of growth (Vrignaud et al. 2024a, 2024b, 2025) - which enables, for the first time, column density measurements in exocometary tails. This approach, applied to numerous UV lines of ionized species, allows us to constrain the ionization state and, crucially, the composition of the exocomets, yielding key insight on their formation place and their potential role in redistributing volatiles throughout the β pic system.

I will also discuss how the excitation state of species like Fe II can be used to probe the architecture of the transiting gas. Preliminary results show that Beta Pic is routinely occulted by a variety of gaseous clouds with stellocentric distances ranging from 0 to 100 au. This suggests that cometary tails - produced by the sublimation of nuclei close to the star - can persist and gradually migrate outward, potentially contributing to the replenishment of the distant circumstellar disc.