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research highlights

DEBRIS DISKS

Exocometary hydrogen

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The young Beta Pictoris system (β Pic) is very popular among observers, as both its debris disk and its planet — β Pic b, a large gas giant seven times more massive than Jupiter — can be imaged directly with good spatial resolution. Thus, the system can provide insights on the early stages of formation of a solar system.

Despite this important role of β Pic, the key hydrogen abundance of the system had never been measured, as observations of hydrogen lines are challenging — space-based telescopes are needed to observe in the far ultraviolet and the signal from the disk is difficult to disentangle from the hydrogen of the interstellar medium. Paul Wilson and collaborators managed to overcome these difficulties and extract an upper limit for the hydrogen column density of the disk through a careful data treatment of Lyman-α observations of β Pic from the Hubble Space Telescope.

The results paint an intriguing picture. The hydrogen abundance is higher than standard meteoritic material, indicating that the gas is probably not generated by dust grains. However, it is also subsolar, which means that the hydrogen does not come from the remnants of the protoplanetary disk or the star itself. This seems to support the hypothesis that the observed hydrogen originates from the dissociation of evaporating water from icy bodies or planetesimals, that is, 'exocomets'. The H/O abundance ratio, the oxygen abundance having been measured recently by the Herschel Space Observatory, is also compatible with an exocometary origin.

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