Orbital characterization of β Pictoris B and consquence on exiting models

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Abstract

The giant planet β :Pictoris B orbiting the southern star β Pictoris was imaged several times since 2003 [6, 7, 5]. The number of astrometric data points of this planet relative to the star that we have allows a first tentative orbital determination. We made a least-square orbital fit as well as an exploration of the parameter space using a statistical bayesian MCMC (Markov Chain Monte-Carlo) method. We present here our preliminary results of orbital determination. We inverstigate the compatibility of the set of found solutions with preceding models involving the presence of a planet orbiting β Pictoris :

- The transit hypothesis: [8] and [9] reported a possible transit event due to a passing planet on Nov. 10, 1981. [10] claimed that β Pictoris B could be that planet. We reinvestigate here this issue.

- Falling Evaporating Bodies : Numerous transient spectral event in the absorption spectrum of β Pictoris were attributed to evaporating stargrazing comets passing crossing the line of sight, called afterward *Falling Evaporating Bodies* ([1, 2] and refs. therein). This phenomenon was furthermore explained as resulting from bodies locked in mean-motion resonances with a Jovianlike planet with predicted parameters that fairly well match those of β Pictoris B [3, 11, 4]. We discuss here in which way the orbital determination helps refining this issue.

In any case, the astrometric follow-up of β Pictoris B in the upcoming years will be of crucial interest to constrain all these models.

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