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The formation of giant planets and its effects on protoplanetary disks: the case of Jupiter and the Jovian Early Bombardment

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Abstract.

The formation of giant planets is accompanied by a short but intense primordial bombardment (Safronov 1969; Weidenschilling 1975, 2001; Turrini, Magni & Coradini 2011): the prototype for this class of events is the Jovian Early Bombardment (JEB) caused by the formation of Jupiter in the Solar System (Turrini, Magni & Coradini 2011; Turrini, Coradini & Magni 2012). The JEB affected the collisional evolution of the minor bodies in the inner Solar System by inflicting mass loss to planetesimals (Turrini, Coradini & Magni 2012; Turrini 2014; Turrini & Svetsov 2014) due to cratering erosion and, at the same time, delivering water and volatile materials to the asteroid belt (Turrini & Svetsov 2014). The JEB also resulted in a significant number of collisions between Jupiter and planetesimals formed over a wide orbital range, delivering volatile and refractory materials to the giant planet and its circumplanetary disk (Turrini, Nelson & Barbieri 2015). In this talk I'll discuss how the study of the effects of the JEB on Vesta can be used to constrain the early evolution of the Solar System (Turrini 2014; Turrini & Svetsov 2014) and how these constraints can, in turn, provide insight on the composition of Jupiter and of its satellites. Finally, I'll discuss the implications of the JEB model for extrasolar planets (Turrini, Nelson & Barbieri 2015).

References

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