



Oligarchic formation of hot Neptunes

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Recent observations have revealed a new and somewhat surprising population of hot Neptunes and super-Earths (Beaulieu et al. 2006; Rivera et al. 2005), including the remarkable three-Neptune system HD69380 (Lovis et al. 2006). Several formation scenarios have been proposed, where most combine the canonical oligarchic picture of core accretion with type I migration and planetary atmosphere physics (e.g. Terquem & Papaloizou 2007; Alibert et al. 2006). To date, due in part to the computational challenges involved, published studies have considered only a very small number of progenitors at late times. Unfortunately this leaves unaddressed important questions about the global viability of the models. To overcome this weakness, we derive new methods for parallel numerical simulations of large-dynamic-range problems in planetary dynamics, which can provide orders-of-magnitude improvements over the standard approach. We review our current understanding of the formation of hot Neptune systems and present preliminary results on their possible oligarchic formation histories.