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Constraints on solar system formation from young extra-solar planets

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The study of planet formation was heavily theory-dominated until 1995, when the main planet formation theory (the most massive planet forms near the ice condensation shock front at several AU, like Jupiter) was falsified with the first extra-solar planet detection in 1995 (massive planets are very close-in, like 51 Peg b, possibly due to migration). To compare our solar system with other systems and to test current planet formation theories, in particular migration, we would need to observe young exoplanet systems. So far, there are no transiting exoplanets known younger than few 100 Myr. If we could detect a transiting exo-planet younger than 10 Myr, we could determine its radius and, hence, whether it was formed by accretion (growing) or collapse (contracting). We search for such objects in several young star clusters [1] and will present our first results. Also, the youngest planet to be detected, e.g. by direct imaging, can set an upper limit on the planet formation time-scale.

[1] Neuhäuser et al. (2011) AN 332, 547-561

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