Planets of intermediate-mass stars with PLATO

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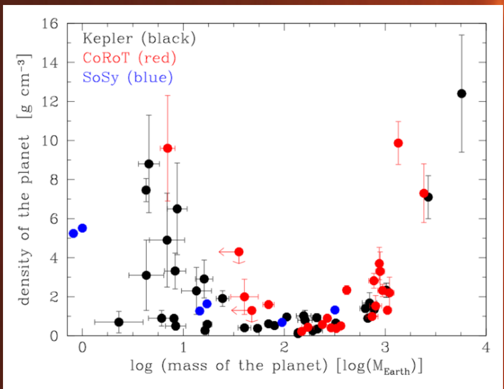


Planets of intermediate-mass stars as a tool for understanding planet formation and evolution

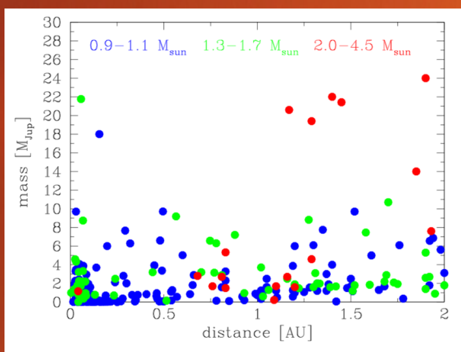
Compared to the proto-planetary disks of solar-like stars, intermediate-mass stars have disks that are typically twice as massive but live only half as long (τ_{disk}=1.2 Myrs compared to τ_{disk}=2.5Myrs; Mamajek 2009). How do properties of the planets change depending on the mass and life time of the disk? Once the planets are formed, they are exposed to a much higher level of XUV-radiation which might cause an erosion of their atmospheres. The figure on the left shows the mass-density diagram for planets of solar-like stars. Will planets of intermediate-mass stars have higher densities? How will they evolve?

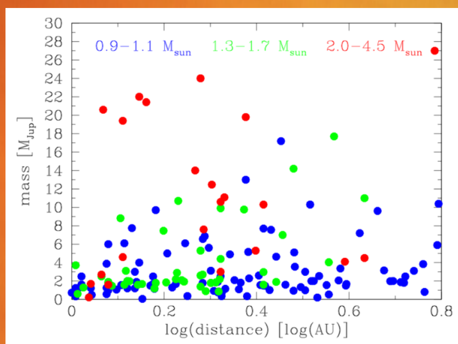
By studying planets of intermediate-mass stars we can find out how the mass and life time of the disk, and the amount of XUV-radiation effects the formation and evolution of planets.

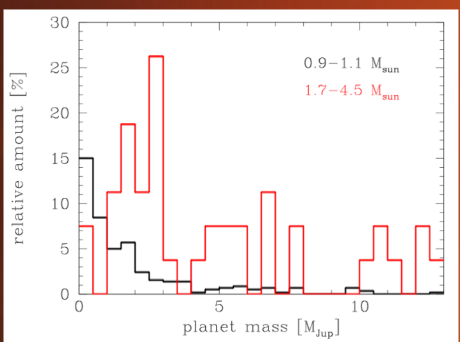
Bright prospects for the PLATO observations

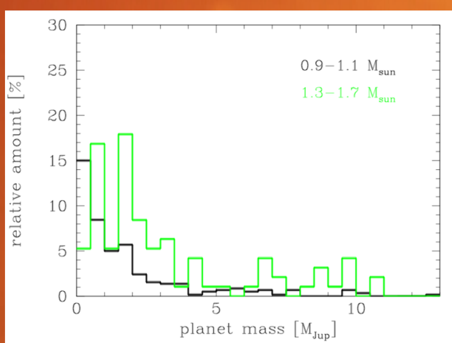
PLATO will observe about 20000 A stars and 20000 B stars. With PLATO it will be possible to detect planets as small as 2-4 R_{Earth} for A stars, and 4 R_{Earth} for B stars.

The figures on the right show the mass-distance relation for planets of stars with different masses. One might think that close-in planets of massive stars are missing but this is an observational bias. Most of this data was obtained from RV-measurements of giant stars that do not have close-in planets. PLATO will detect the close-in ones, measure their masses, radii, and densities.









As the figures on the left and above show, intermediate-mass stars have more planets, and many of them are very massive. However, up to now we know nothing about the low-mass planets of these stars. With PLATO it will be possible to detect them and to study how they evolve.