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The first extrasolar planets from the TOPS program: a superplanet around a massive evolved star and an F7 star

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The Tautenburg Planet Search Program (TOPS) of the Thüringer Landessternwarte Tautenburg (TLS) uses precise radial velocity measurements of stars to search for extrasolar planets. This program started in 2001 and has monitored approximately 100 stars of diverse types. Here we report on the discovery of the first two extrasolar planets from this program. One planet has an estimated mass of 8-20 $M_{Jupiter}$ and orbits with a 470-day period around HD 13189. We determine the spectral type of the host star as K2 II. With an estimated progenitor mass of 2–7 M_{sun} this is the most massive star to possess an extrasolar planet. Most extrasolar planet discoveries made with radial velocity measurements have been for solar-type stars. Of the more then 130 extrasolar planets around normal stars that are known, 96% occur around stars in the mass range 0.8–1.5 M_{sun}. We thus know very little about planet formation around more massive stars. Objects like HD 13189 may provide insight into this. The second planet is in a Mars-like orbit (P = 639 days, a=1.58 AU) around the F7 star HD 8673 (mass = 1.3 $M_{\odot}$). This planet has an estimated mass of 10–18 $M_{Jupiter}$. It is one of few planets found around an F-type star. The companions of HD 13189 and HD 8673 qualify as "superplanets", objects with masses intermediate to Jovian-like exoplanets (mass = 1–5 $M_{Jupiter}$) and brown dwarfs that have masses between 20 and 70 $M_{Jupiter}$. These types of planets may shed light on the nature of the Brown Dwarf Dessert (the paucity of brown dwarf companions to stars).