Structure and evolution of planets with EChO

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EChO will characterize planets ranging from Jupiter to super-Earth size. The measurements of their atmospheric properties (temperature, composition, dynamics) by spectroscopy combined with phase curve variability will be key to understand the planets' structure and evolution. Indeed, the atmosphere acts as a lid that controls the heat that is absorbed and reemitted and thus both the planet's structure and evolution. The determination of both the atmospheric temperature structure and composition will be crucial to better determine the planets' global (interior) compositions and the link between atmospheric, interior composition and properties of the parent star.

EChO's ability to perform this determination for a variety of planets (massive or not, close or further from their star) will help us to understand how planets acquire their atmospheres/envelopes, how they may loose them and under which conditions planets become solid, liquid or gaseous.

The possibility to time the secondary eclipses precisely and thus constrain the planets' eccentricity can, when an eccentric massive second companion is observed, lead to a unique constraint on the transiting objects' Love number and therefore whether its heavy elements are mostly present deep into a central core or rather mixed in an envelope.

All in all, these pieces will be crucial to reconstruct the planet formation puzzle.