**Introduction:** The recent discoveries of several Hot Neptunes (HNs) and Close-in Super Earths (SEs) have stimulated the development of several models trying to explain their formations scenarios. Close-in giant planets are thought to have originated in the cold outer region of protoplanetary disks and migrated inwards until they stopped at closer orbital radii [1], [2], [3]. This scenario allows for example an explanation of the formation of the HN GJ 436b [4] in addition to a large number of Hot Jupiters (HJs), thought the migration types are different since HJs are able to open a gap in the disk (type 2 migration) as opposed to HNs (type 1 migration). A more recent formation scenario showed that HNs may have been originated from a partially evaporated HJs [5], [6]. In the case of SEs the situation is less clear: Thought the core accretion - type 1 migration model has been applied to explain their formation [7], [8], other scenarios arguing for in situ accretion are also plausible. In the case of Gliese 876d for example, the temperature at 0.02 AU from M-type host star is low enough for heavy elements to condense, allowing an in situ formation by accumulation of heavy material that spiraled in with the gas through the circumstellar disk [9]. This type of models has been applied also to explain other SEs [8], [10]. Here we propose a possible observational signature to distinguish between these different scenarios.

**Methods:** We have chosen the hot planet Kepler 21b as a case study due to its ambiguous mass (about 10 Earth-masses) along with its semi-major axis of 0.04 AU. Thermodynamic conditions of the stellar nebula are derived from a disk model. The HSC Chemistry package is then used to obtain the rocks composition as a function of the heliocentric range, allowing us to estimate the amounts of trace elements accreted by a migrating body in opposition to a body formed in situ. The disk's temperature-distance and pressure-distance profiles have been calculated using a disk model for a standard solar type star [11]. The species used are the same as in Bond et al. 2010. The abundances are assumed to be proportional to the solar values multiplied by the metallicity ratio between the host star and the sun. Results are given in Fig. 1.

**Results:** Several abundances of condensates peak at a small temperature interval in the disk and can be used to distinguish the formation scenarios. Since TiO and VO are believed to induce significant atmospheric inversions [12], the temperature over which Ti bearing molecules are found could be a good indicator for investigating the formation locations of planets with atmospheres containing those inversions. Indeed we notice a constant molar ratio of solid TiO$_2$ for low temperatures, followed by a strong decrease for $T > 600$ K. Solid TiO is found to peak at 600 K but with negligible quantities. In contrast, Ti condensates in TiN form in the hot part of the disk; but since planetesimals forming in this region will be oxygen-poor, it is hard to make important amounts of TiO in this zone. Therefore, a planetary core migrating from the cold outer nebula to a small close-in orbit, assuming it to be the first massive body to migrate through its system, should have higher quantities of TiO resulting in a thermal inversion, as opposed to a planet formed in situ or migrating from small distances in the inner hot nebula. A detailed study of the distribution of Ti-bearing elements and other species will be presented in a forthcoming paper.

**Acknowledgments:** O.M. is supported by CNES.

**References**

Figure 1: Mole fractions of refractory molecules present in solid forms in the proto-planetary disk. Note that the abundance of Ti$_2$O$_3$ (non dashed black line) is high at temperatures ranging between 200 and 600 K. This temperature range corresponds to the one encountered by bodies like most HNs during their migration. The abundance of Ti$_2$O$_3$ strongly decreases at higher temperatures where in situ formation takes place.