Discussion S5:
EELT Characterization of HZ planets

• **Concept of Habitability (MMe)?** What scientific experiments can we do to search for terrestrial planets versus what 'exploratory observations' can we make for 'habitability'? Given that our ideas about what worlds could be habitable or not, we should be cautious about 'experimental design' too focused on worlds that might or might not be habitable?

• **EELT will arrive after a decade of HZ planets surveys.**
- RV surveys (VLT/ESPRESSO, CFHT/SPIROU, CARMENES...) and Transit surveys (K2, TESS, PLATO...). Can expect a large number of HZ planets known around *G, K &* M dwarfs. Better understanding on the occurrence and population properties of rocky planets in HZ zone. (David)
- HZ planets Detection: METIS-L band >> pushing HCI into the limits - Sascha
- Difficulty to detect twin-Earths around G dwarfs in RV (stellar noise) - Simon
>> best targets for EELT, but how many targets with HZ planets in 2023?

• **E-ELT, a top future facility for bio-signature detection?**
- **HCI**+**HDS**: the way for 10-9 needed O2/O3 detection? (Markus, Ignas)
>> **Completely new technique**, not present in any phase A concepts
>> Simulation/Experiment for HIRES(+AO/IFU), METIS & PCS
>> understand ultimate performances
- necessary as observations will be time-consuming (David)

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- **From the theoretical/modeling point of view (Jason):**
  - Mature enough on the physics of HRS lines, molecular database (Mateo)?
  - Mature enough to understand/model rocky planets composition & atmospheres (Jay)?
  - Biomarkers to be used (detectability, combination...)?

- **What will do JWST to prepare EELT science on HZ planets?**

- **Synergy with different techniques to have a global view of planetary systems hosting HZ planets (presence of giant planets...).** Conditions favorable to form rocky planets in the HZ?

- **Are the scientific goals sufficiently ambitious?**