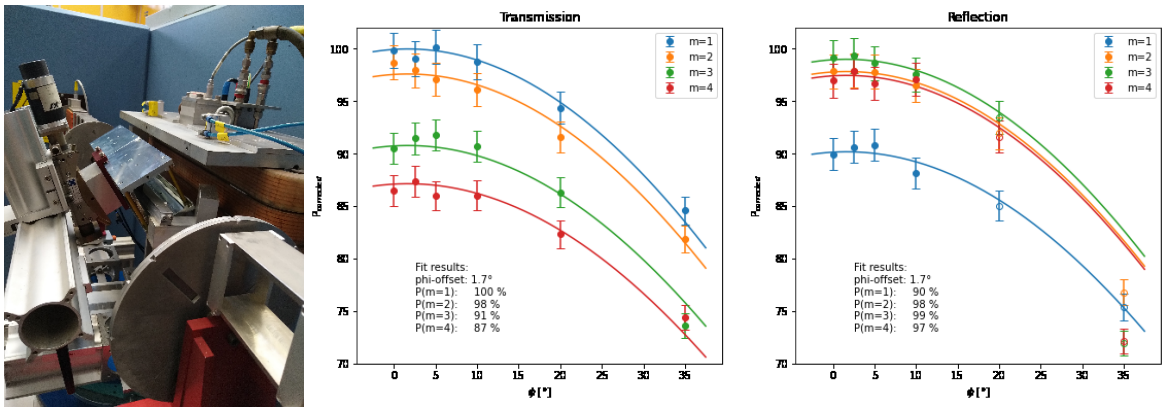
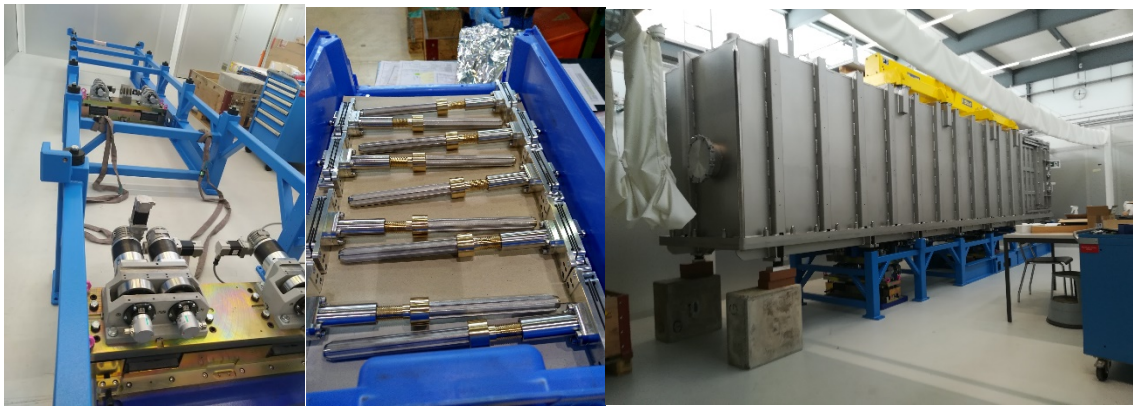
Progress report of the Estia project

Since the last STAP meeting in April 2020

Test of influence of guide field angle on polarizer efficiency in transmission and reflection:





General Progress:

- Selene Guide:
  - Contract with SwissNeutronics for the guide optics was signed. Delivery is on critical path but still compatible with ESS schedule. Price is in budget.
  - Selene carriers had manufacturing issues that lead to delays due to the need of repair steps. Delivery of Selene 1 carrier is expected for November.
  - All other components for Selene 1 have been delivered and installation is going well. This includes interferometer, vacuum vessel and support, carrier movers on the floor, kinematic mounting points, metrology cart and adjustment robot.
- A conceptual design of the experimental cave was finished. Shielding calculations look good and we are currently evaluating the floor loads.
- The chopper pit system with the virtual source have passed sub-TG3 in September. Manufacturing has started and will mostly be done in-house. The spindle procurement done by the ESS common chopper project makes good progress and should be done in time.
- Support and vacuum vessel of the in-bunker neutron feeder is being manufactured and expected to be delivered by Feb 2021.

- Magnetic field calculations for the Estia analyzer by ESS show promising results with Hallbach-like geometries. The influence of angular deviation of the guide field to the mirror has been measured at PSI and the results show a clear cosine dependence of the polarization by the field angle. The conclusion is that 5° inclination does not have significant impact on the polarization. The field calculations are not finished, but they seem to be compatible with this restriction.
- COVID-19 impact on the Estia project is thus far limited. Largest impact is on the NBOA production at SwissNeutronics, as they could not perform reflectometry measurements on the manufactured components. The resulting delays do not impact the project, as the installation at ESS still has many months float.

STAP recommended actions:

- Further tests, analysis and report on the multiblade detector:
  A prototype of the Estia detector with full blade height and the mounting concept to be used in the final detector have been tested on AMOR. We had a few issues with electronics, otherwise the larger blades performed as expected. One of the blades were slightly misaligned due to positioning points being manufactured outside our tolerances, it is foreseen to include this experience in the quality assurance process for the final manufacturing.
  On IKON the detector group reported on the impending test of the ESS electronics for the MB. If successful, these will be used to run a prototype at PSI for the commissioning of AMOR within the next year.
  The initial costing produced by ESS recently was found to be 2.5 fold the available budget. PSI is working with ESS to find a way to solve this discrepancy, including alternative technological solutions like SONDE or Jalousie detectors.
- Hire 2 instrument scientists:
  New instrument scientist for Estia, [redacted] will start in January 2021. [redacted] was one of several highly suitable candidates and will further strengthen the project in areas like sample environment with her soft-matter background. In addition, the DMSC has hired Andrew McCluskey as data instrument scientist for reflectometry, another very well suited candidate.
- Identify maximum tolerable misalignment/gap errors in tiling of mirrors and incorporate as a procurement specification:
  See results above.