

TEQ - Experiment meeting, Trieste 19/9/19

Minutes

Purpose of meeting: To update on developments of setting up the TEQ experiments and its components. This is the follow up meeting from the meeting at UCL in July 2019.

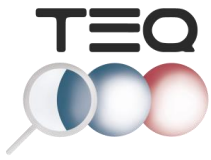
Agenda

14:00	Arrival and start of meeting, general comments, state of play in testing CSL
14:15	Update on blade trap (Michael)
14:45	Update on electronics (Catalina, Max, Peter, Michael)
15:30	Update on particle trapping (Peter, Hendrik)
16:00	Discussion and decision on next steps and timeline for implementation of trap with low noise electronic at Aarhus & UCL, test of blade trap at UCL.
16:30	Discussion on detection and particle loading: Options and realisation
17:00	Discussion on next steps with cryo and towards completion of the TEQ experiment at Southampton

Location: Adriatico Guesthouse, Trieste, IT.

Participants: Catalina Curceanu, Michael Drewsen, Peter Barker, Max Bazzi, Antonio Pontin, Andrea Vinante, Matteo Carlesso, Hendrik Ulbricht.

- Michael has redone the electrode blades, coated and send back to UCL for testing for trapping nanoparticles.
- Peter to test those for trapping and feedback, with optical detection, to be done in the next three weeks.
- Discussion about electrode design, we wait for Peter's tests of the blade trap and noise measurements from heating rates and then decide if we change trap design (decision to be taken by December 2019 or earlier).
- Chip trap from Tracy has better optical access (fabricated at NIST), pyramid structure.
- Electronics: Michael (addition of capacitors to **DAC** bring noise down to level of battery system)



- Electronics Max: UCL system (AC/DC complete system, parameters agreed, noise 160 nV, +/-350V, amplifier, compact system on one board, PCB design on-going, 4 pieces, October 2019 to complete boards, DC power supplies, not the blade trap), Aarhus system is ready for low noise performance.
- For blade trap one needs different electronics, operation with segments has to be decided after December, then we need 12 channels for AC/DC at low noise. Analogue or DCA based system to be decided
- Aarhus satisfied about electronics
- Electronics for Southampton has to be decided, again December 2019.
- Intermezzo: Cosmic rays as noise source, tiny cross section for particles, but if issue a later experiment at Gran Sasso could be discussed, this would cancel the issues (if any) of cosmic rays (could be an interesting option as well for a levitated NP experiment to test DM).
- Southampton:
 - Showed movie of installation of fridge in Soton lab.
 - Next steps include: vibration tests with magnetic levitation
 - Paul Trap design to be decided for the fridge.
 - Loading like Tracy, aluminum membrane and laser.
 - Detection two options: camera like Peter or optical tweezer ... , heating of detection, discussion about power.
- **Next meeting: December 2019 at Southampton / Hendrik Ulbricht to send email to fix date.**