UK Accelerator Institutes Seminar Series Winter 2026 (Session 15)

Report of Contributions

https://indico.cern.ch/e/1640767

Contribution ID: **16** Type: **not specified**

100 Hz laser for high rep rate accelerator applications

Thursday, 12 March 2026 16:00 (1 hour)

Presenter: SARRI, Gianluca (Queen's University Belfast)

Contribution ID: **17** Type: **not specified**

The Accelerator on a Nanophotonic Chip

The highly successful RF accelerator technology is based on a structured vacuum, fit to the wavelength of the driving RF or microwave fields. The same principle can be used with light. Because the wavelength of light lies around 1 micron, acceleration structures need to be fabricated with a feature size on the sub-micron scale –a standard size for cleanroom-based nanofabrication. We will show that we can now build laser-powered nanophotonic structures that not only accelerate electrons but that also keep them together. For this, we use alternating phase focusing, a well-known scheme also used in RF ion accelerators. We employ it in the nanophotonics realm to keep the injected electrons on track in the 200nm narrow acceleration channel. Based on this, we can now accelerate electrons over 0.5mm and observe substantial energy gains. The current status of on-chip accelerators will be presented, with an outlook on near term goals and far term opportunities.

Presenter: Prof. HOMMELHOFF, Peter (LMU Munich)

Contribution ID: **20** Type: **not specified**

LHC Phase II

Thursday, 5 March 2026 16:00 (1 hour)

Presenter: DABROWSKI, Anne (CERN)

Contribution ID: **21** Type: **not specified**

Seminar 1 - TBC

Contribution ID: **22** Type: **not specified**

British Cryogenic Council Prize Talk - From Bulk Niobium to Thin Films: Advancing SRF with High Throughput Cryogenic RF Characterisation

Thursday, 12 February 2026 16:00 (1 hour)

Superconducting radio frequency (SRF) cavities underpin many modern particle accelerators, enabling highly efficient acceleration with high duty cycle or continuous wave operation. However, this technology relies almost exclusively on bulk niobium cavities operating at around 2 K, bringing significant capital and operational costs while performance increasingly approaches theoretical limits. Thin film SRF technology offers an alternative route to more sustainable accelerators by decoupling RF performance from the bulk, enabling the use of cheaper substrates (such as copper) and alternative superconducting materials (e.g. Nb3Sn) with the potential for higher temperature operation.

This talk introduces the importance of thin film SRF and outlines the ongoing research programme at Daresbury Laboratory. During material development, tests must first be carried out on small samples, where substrate preparation and deposition parameters can be optimised before committing to full cavity tests. A key metric is the RF surface resistance, which must be measured under cryogenic conditions (3.8 –20 K). While a small number of dedicated RF test facilities exist worldwide, many are limited by a slow sample turnover. To address this, a core element of the programme has been the development of a dedicated RF characterisation facility, designed primarily to deliver quick sample measurements. Its successful operation shows that high throughput RF characterisation is critical for accelerating thin film SRF development and guiding future cavity fabrication.

Presenter: SEAL, Daniel

Contribution ID: **23** Type: **not specified**

LUXE: a new experiment to study non-perturbative QED and search for new particles in electron-laser and photon-laser collisions

Thursday, 19 February 2026 16:00 (1 hour)

The LUXE experiment (Laser Und XFEL Experiment) is an experiment in planning at DESY Hamburg using the electron beam from the European XFEL. LUXE is intended to study interactions between a high-intensity laser pulse and 16.5 GeV electrons from the EuXFEL electron beam, as well as interactions between the laser pulse and high-energy secondary photons. This will elucidate quantum electrodynamics (QED) at the strong-field frontier, where the electromagnetic field of the laser is above the Schwinger limit. In this regime, QED is non-perturbative and remains largely unexplored in the laboratory. LUXE intends to measure the positron production rate to high precision in an unprecedented laser intensity regime. There is also the possibility to search for particles beyond the Standard Model of particle physics by dumping the large number of photons produced in target and looking for exotic signatures. An overview of the LUXE experimental setup and its challenges and recent progress will be given, along with a discussion of the expected physics reach in the context of testing QED in the non-perturbative regime.

Presenter: WING, Matthew (University College London and DESY)

Contribution ID: **24** Type: **not specified**

Seminar 4 - TBC

Thursday, 26 February 2026 16:00 (1 hour)

Contribution ID: **25** Type: **not specified**

Seminar 7

Contribution ID: **26** Type: **not specified**

Muon Collider Progress and Plans

Thursday, 29 January 2026 16:00 (1 hour)

A muon collider is a unique option to achieve lepton collisions at the 10 TeV scale with high luminosity. The high muon mass suppresses beamstrahlung allowing to accelerate and collide the beams in rings. The limited lifetime of the muon, however, poses challenges and calls for technology and design innovations to make the first collider a possibility. An international collaboration is addressing these challenges. The presentation will introduce the concept, summarise the progress of the R&D and highlight the path to the future.

Presenter: SCHULTE, Daniel (CERN)