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## **Design of a broadband modular permanent magnet electron energy spectrometer for FEBE**

*Thursday, 11 May 2023 16:30 (2 hours)*

The CLARA accelerator facility at Daresbury Laboratory, UK, was originally designed to operate as a free-electron laser test facility. To improve the user exploitation of the facility a dedicated full energy beam exploitation (FEBE) area has been designed and is currently being installed in a separate experimental bunker on the CLARA accelerator. This facility will allow users to conduct experiments combining a 250 MeV electron beam of up to 250 pC bunch charge with laser pulses up to 100 TW in a large target chamber. A second downstream chamber contains room for a number of diagnostics that are customisable to the experiments being conducted.

The ability to combine a laser and electron beam in FEBE presents the possibility of novel acceleration experiments. FEBE is designed to allow user experiments which aim to further accelerate the electron beam from 250 MeV to 600 MeV, or 2 GeV at a reduced repetition rate. To measure the output of these experiments an innovative in-vacuum permanent magnet spectrometer dipole has been designed with modular construction to measure broadband electron energy spectra. The modular nature allows the length of the installed dipole to be tailored to the experiment, allowing room for additional diagnostics in experiments where maximum energies below 2 GeV are expected.

### **Funding Agency**

### **Footnotes**

### **I have read and accept the Privacy Policy Statement**

Yes

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