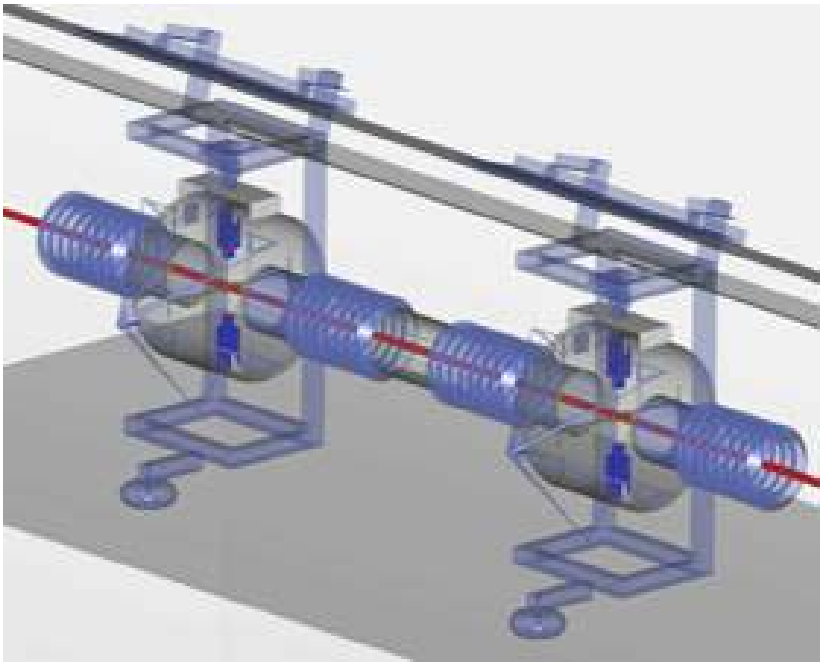
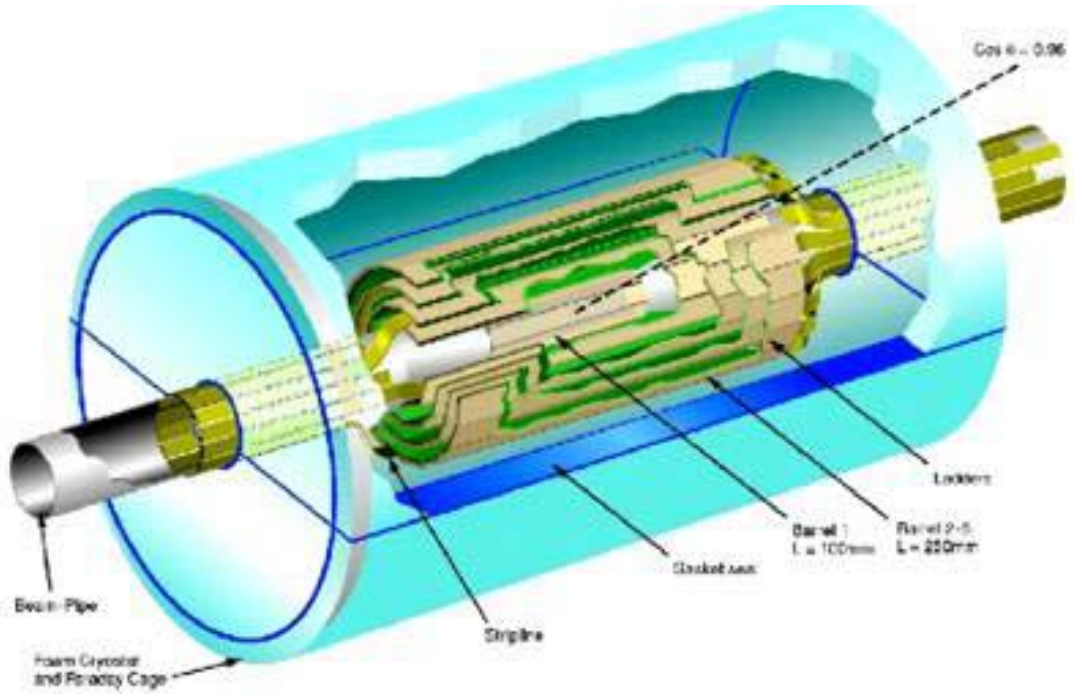
Linear Colliders

In order to achieve centre-of-mass energies in the TeV range, the next generation of electron-positron colliders will be based on linear accelerators. This poses numerous problems in the areas of accelerator alignment, beam steering and detector development.

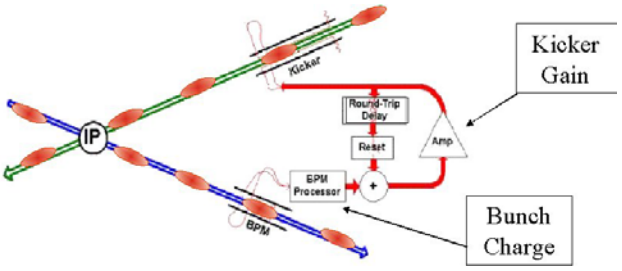


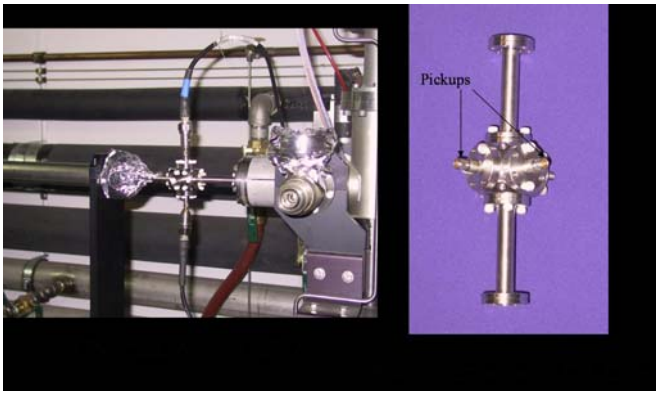
The LiCAS project will use Frequency Scan Interferometry to align the beam components of the collider to precisions of ~ 10 nm. A train equipped with an FSI system and a laser straightness monitor, will travel along the tunnel of the accelerator and establish a system of reference marks. This project benefits from the experience gained in building the ATLAS and ZEUS detectors.

Oxford is participating in the LCFI project, which aims to develop very thin Charge Coupled Devices (CCD) with fast readout to match the conditions at the future Linear Collider. The picture shows a multi-layer Vertex detector which will be used to detect the decays of short-lived particles.



If the electron and positron beams do not collide head-on, they suffer an angular deflection. The Feedback On Nanosecon Timescales (FONT) aims to measure this deflection and apply a correction during the bunch train. This means that the overall response time must be about 20 ns.





A fast beam position monitor built for tests of FONT at SLAC

A fast power amplifier built in Oxford to power the FONT kicker