

Input to the LCC detector R&D questionnaire

CLIC detector and physics study (CLICdp)

Web page: [CLICdp](#)

List of participating institutes: [CLICdp institutes](#)

Documentation, ongoing R&D, R&D plans, engineering challenges:

- Overall R&D goals can be found in the CLIC CDR, chapter 13: [CLIC CDR on physics and detectors](#)
- Another useful reference is the recent CLICdp input to the AIDA-2 proposal. It summarises the proposed CLICdp activities in the AIDA-2 framework: [CLICdp input for AIDA-2](#)

Ongoing R&D:

Groups in CLICdp participate in the following R&D efforts:

- CLIC vertex detector R&D (is embedded in CLICdp)
- CALICE [CALICE web](#)
- FCAL [FCAL web](#)
- Forward silicon tracking (no dedicated web page, principally pursued by the Spanish network for Future Linear Colliders)
- Superconducting detector solenoid R&D (no dedicated web page)

Input to the LCC detector R&D questionnaire

CLIC vertex detector R&D

To achieve the physics goals of flavour tagging at CLIC, a vertex pixel detector with high spatial precision (3 μm single-point resolution), 10 ns time stamping and ultra-low mass (0.2% X_0 per detection layer) will be required.

Participating CLICdp institutes:

- CERN
- Spanish network for Future Linear Colliders
- University of Liverpool
- Institute of Space Science, Bucharest
- University of Bristol

The University of Glasgow and the University of Oxford also intend to be involved, but they have not yet contributed.

Ongoing R&D efforts for the CLIC vertex detector include:

- Development of the CLICpix hybrid pixel readout ASIC with 25 μm pitch, analog readout, time stamping, and power-pulsing functionality, implemented in 65 nm CMOS technology
- Development of ultra-thin (50 μm) planar pixel sensors, as well as active sensors with capacitive coupling
- Low-mass fine-pitch interconnects between sensor and ASIC
- Through-silicon via technology for powering, configuration and readout of the ASIC
- Low-mass powering infrastructure, including power-pulsing with local energy storage
- Low-mass carbon-fibre supports
- Detector cooling based on forced air-flow
- Concepts for mechanical integration and detector assembly
- Detector layout optimisation studies

Documentation:

Vertex-Detector R&D for CLIC [2014 JINST 9 C03026](#).