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Machine protection challenges in CLIC

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The proposed Compact Linear Collider (CLIC) is based on a two-beam acceleration scheme. The energy of 48 high intensity, low energy drive beam trains is extracted and transferred to 2 low intensity, high energy main beams. A single drive beam-train has a damage potential that is two orders of magnitude above the level causing structural damage in copper. The extreme charge density due to the microscopic beam size gives the main beam already at low energies a damage potential four orders of magnitude above the safe level.

The machine protection system in CLIC has to cope with a wide variety of failures, from real time failures (RF breakdowns, kickers misfiring), to equipment failures, to beam instabilities (caused by e.g. temperature drifts, slow ground motions).

This presentation introduced the baseline for the CLIC machine protection philosophy based on passive, active and permit based protection.

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Session Classification: Introduction; Machine protection, experience and challenges