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The Linear Collider Software Framework

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For the future experiments at linear electron–positron colliders (ILC or CLIC), detailed physics and detector optimisation studies are taking place in the CLICdp, ILD, and SiD groups. The physics performance of different detector geometries and technologies has to be estimated realistically. These assessments require sophisticated and flexible full detector simulation and reconstruction software. At the heart of the linear collider detectors lies the particle flow reconstruction requiring the combination of fine-grained calorimeters and advanced clustering software.

The similarities between the different detector concepts allow for the use of common software tools. All the concepts share an event data and persistency format which enables the sharing of files and applications across the concepts. Particle flow clustering, vertexing and flavour tagging is already provided by stand alone packages via lightweight interfaces. In the near future the geometry information for all detector layouts will be provided by a unique source for the simulation and reconstruction programs, providing further re-use of software between the collaborations. In addition a track reconstruction package is currently under development.

The sharing and development of flexible software tools not only saves precious time and resources. Using common tools for different detectors also helps to uncover bugs or inefficiencies that would be harder to spot without multiple users. The concept of generic software tools and some of the programs themselves can be beneficial to experiments beyond the linear collider community.

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