

# The ILD Optimization Document

Software and Analysis Chapters

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SW&Ana Pre-Meeting, Feb 19, 2018

- Chapters related to Software and Analysis
  - Detector modeling for optimization
  - Detector Performance
  - Science with ILD

Current proposal:

- New DD4HEP framework
- GEANT4 level of details
- hybrid options for calorimeters
- Digitisation implementation
- Method for BG overlap and anti-DID inclusion

- New DD4HEP framework
  - can be rather short
- GEANT4 level of details
  - describe the engineering level of detail in the simulation models
- hybrid options for calorimeters
  - this is sth. **new**, so we should describe the idea in some detail
  - make clear that this is a valid approach
- Digitisation implementation
  - straight forward
- Method for BG overlay and anti-DID inclusion
  - bg: OK, anti-DID: not used for *physics samples*

Current proposal:

Performance on various levels as function of size (2 models) and/or technology (hybrid sim)

- Updated reconstruction and analysis methods
- Response to individual particles
- Global response including particle flow ideally using both Pandora and Arbor for mutual cross-checks
- Performance on a few physics benchmarks

- Updated reconstruction and analysis methods
  - should probably be moved to 'Detector modeling' chapter
- Response to individual particles
- Global response including particle flow ideally using both Pandora and Arbor for mutual cross-checks
  - standard tracking performance:  $p_t$ ,  $d0$  resolution and trk efficiencies
  - standard PFA performance: JER on uds as function of  $E_{jet}$ ,  $\cos(\theta)$ , ...
  - standard flavor tag performance, PID, ...
- **should think of many more performance plots - suggestions are welcome !**
- Performance on a few physics benchmarks
  - which channels ?

ILD performance for key channels for the “baseline” detector, if we decide on one in time  
Document the ILD performance on key points, as reference for the next couple of years.

Proposal by J.List:

- at 250 GeV
  - Higgs
  - SM
  - BSM
- beyond 250 GeV
  - top mass (350 GeV)
  - top ew couplings
  - SM
  - ttH
  - ZHH / vvHH
  - BSM