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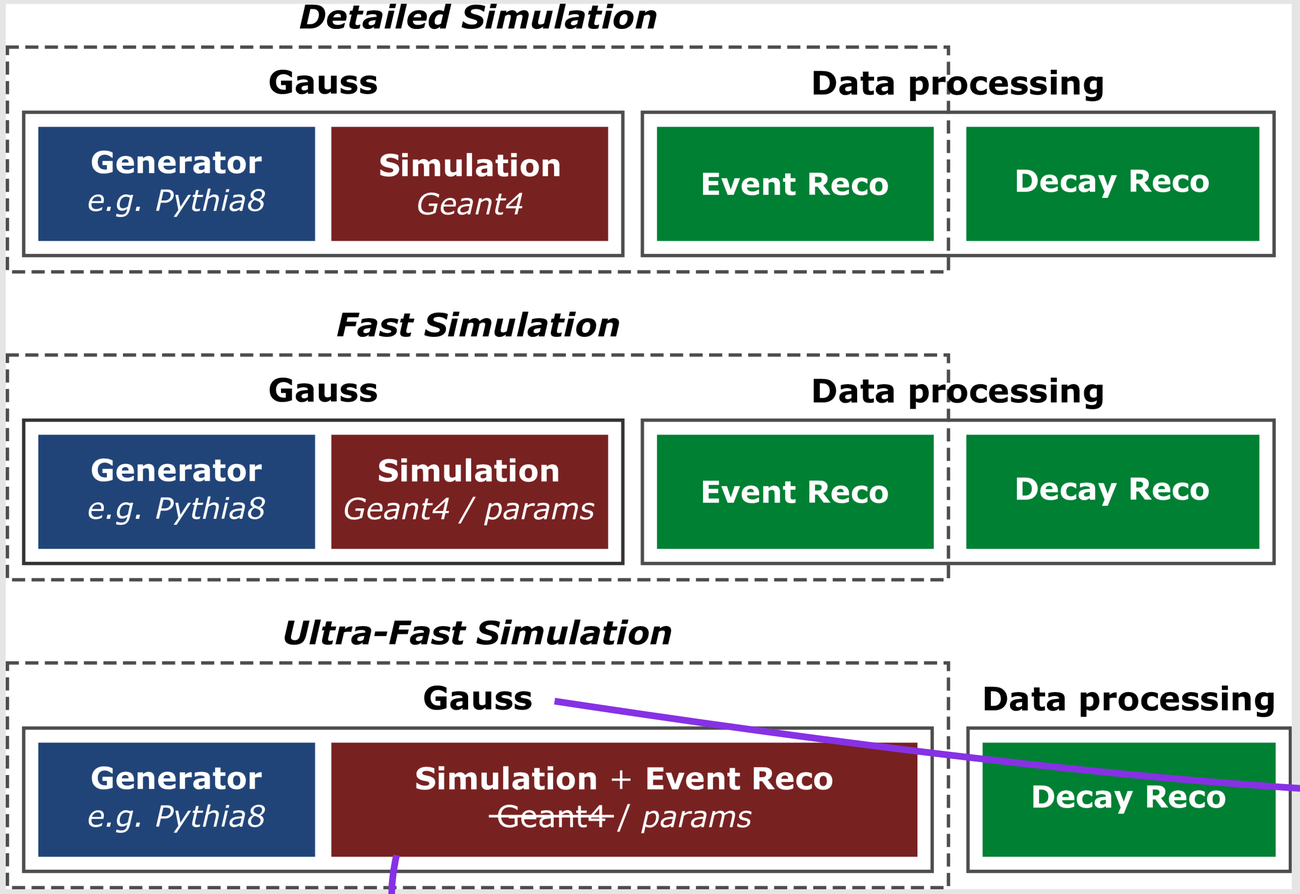
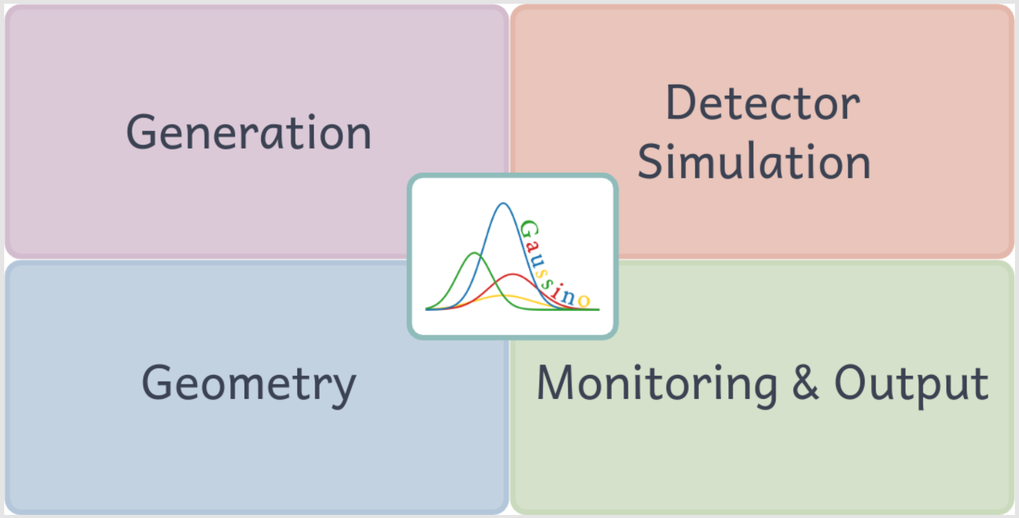
Fast simulation with Lamarr

Marco Gersabeck
based on work by Adam Davis and Keith Evans
AIDAinnova 3rd Annual Meeting, Catania, 18 March 2024

Overview





Experiment-independent: Gaussino

Lamarr

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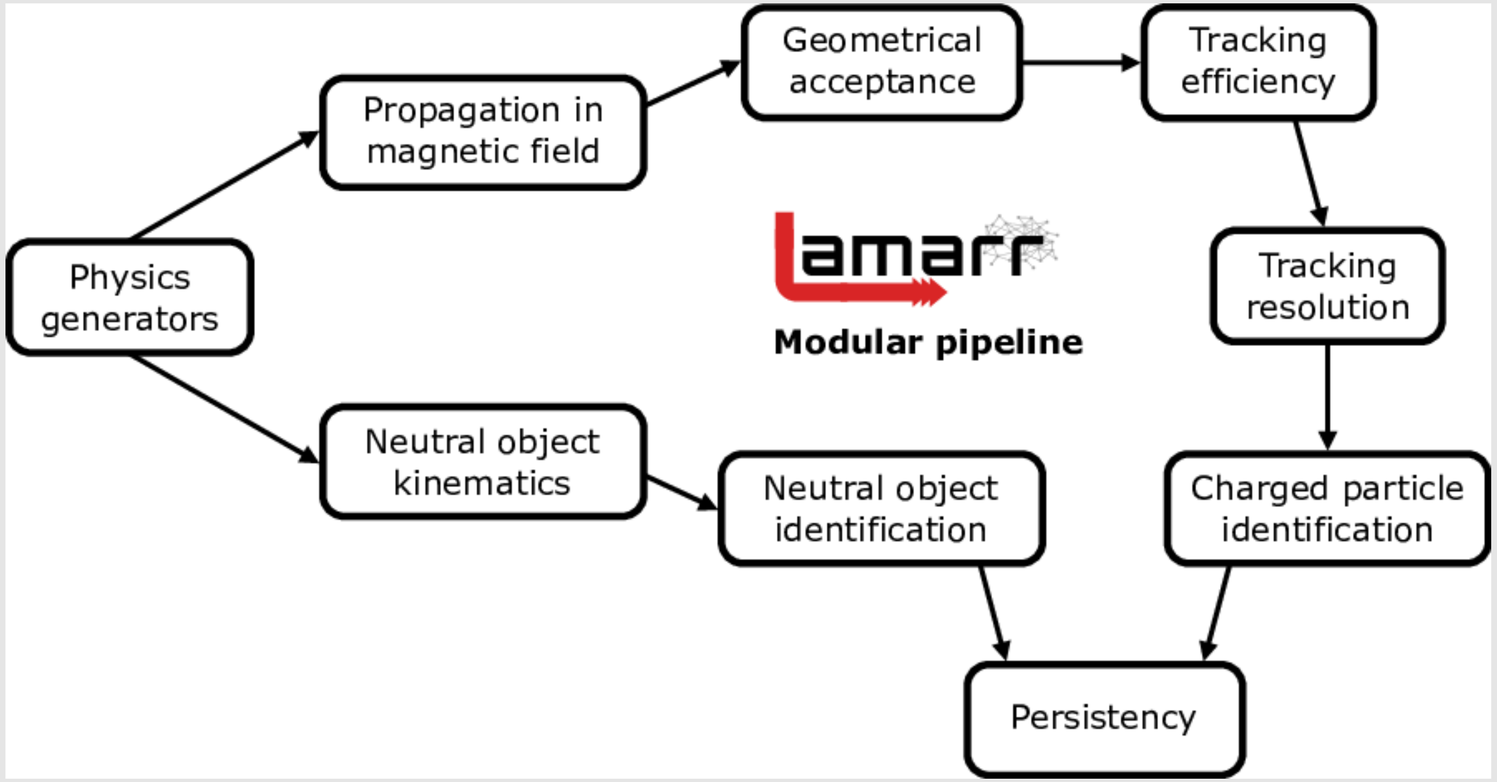
Gaussino

- Adam developed EDM4HEP data model usage in Gaussino
- Code developed with merge request opened
- Needs addition of tests and documentation

Lamarr overview



- Main tasks:
  - ➡ Transition to GaudiFunctional framework and thread safety
  - ➡ Based on calorimeter simulation

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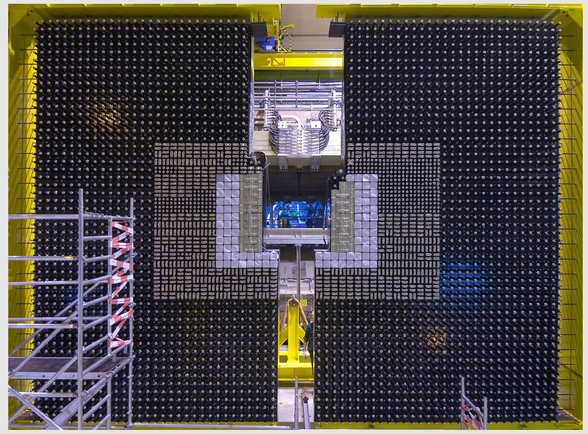
Lamarr progress



- Focused on LamarrCaloProto (calorimeter simulation in Lamarr)
- Improved code documentation
- Declared various functions/subroutines as const
- Calorimeter region identification was changed from std::map to reading in directly from detector description
- Check whether cluster crosses regions with different cell sizes was rewritten (and simplified)
- Random number usage was not thread safe
  - ➡ Used in determination of fraction of energy deposit in region of cell size
  - ➡ Alternative with CLHEP::RandFlat should be thread safe, but implementation is pending
  - ➡ Use of non-random integration grid still yields valid results

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Summary

- EDM4HEP implemented in Gaussino

  ➡ MR pending

- Calorimeter simulation in Lamarr succesfully translated to GaudiFunctional framework

  ➡ Ideally should sort random number generator

  ➡ Need to add tests and open MR

- Looking at new person power to wrap these up within the timeline of AIDAinnova