

At2sim: RoI processing

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Overall approach

- For modelling **no actual data need to be generated or moved** -- **configuration files** drive the **stochastic generation** of physics events & processing decisions.
- In at2sim, as each event is generated, a structure is **pre-built** describing the whole of the Level-2 processing for that event, and used to guide the simulated processing.
- This event-processing structure contains a number of **processing steps**, each referring to one or more **features**. The steps are determined by the processing strategy.

Trigger menus

Processing is guided by LVL1 and LVL2 **trigger menus**, comprising several **trigger items**, each containing **trigger objects**.

In **at2sim** the **Level-1 menu** generates the **input** to the Level-2 system for each event, whilst the **Level-2 menu** is used to determine at what stage the event **is or is not rejected**.

Level-1 input = set of RoIs randomly selected from:

- LVL1 trigger menu (average frequency from trigger menu file),
- file of possible RoI geographical locations.

As processing proceeds, the **candidate menu item** may change as trigger objects are rejected; if so, the Level-2 menu must be checked to see if there is still a valid candidate.

Processing steps & features

The processing of each **trigger object** proceeds in a sequence of **steps**, with each step containing one or more **features*** (event parts which are investigated independently).

At each step, data is requested from a subset of ROBs --> acceptance, rejection, or acceptance at lower energy.

Currently assumed that data for **different trigger objects** of the **same type** is collected in **parallel** (minimises overall time taken, depending on LVL2 switching fabric bandwidth), but that **different types of trigger object** are processed in **sequence** (could be more efficient).

*Currently each feature is associated with a single sub-detector.

Trigger decisions

In general need to decide:

- in **what order** are the **objects in an item** investigated?
 - assumed that objects are investigated in menu file order.
- **which** of several possible **menu items** is tested?
 - the choice of items to test is defined in the method that checks the current candidate item against the LVL2 menu (the new candidate is returned).

Decisions are stochastically generated according to a **table of acceptance rates** for the processing steps of all possible trigger objects (also specifying the sub-detectors involved and the algorithm used).

Status

- RoI-Processing & LVL2-Menu files generated (from Jos' Paper Model note).
- Multi-step processing code added - running, but not yet fully tested.
- Algorithm times currently arbitrary.
- Simplest strategy for choosing LVL2 candidate.
- ECAL layers not yet handled.