Quick overview over Rivet

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What Rivet *not* is

Rivet is *not* . . .

- a tool for detector data preservation (raw or reconstructed)
- a tool for data analysis (though it can analyse four-vectors)
- a mechanical fastener
What is Rivet?

Rivet stands for “Robust Independent Validation of Experiment and Theory” and is a general analysis toolkit for Monte Carlo analyses.

- Can be used for MC validation/tuning – but not exclusively
- Generator independent – uses HepMC as generator interface
- Modular design – very simple to add new analyses
- Great way of archiving analysis knowledge
- \( \approx 220 \) analyses already implemented (97 from LHC – that’s half the LHC entries in Hepdata)

Learn more online: http://rivet.hepforge.org/
A few words on philosophy

- MC meets data at the hadron level, i.e. after detector unfolding but before the introduction of model dependencies
- Only look at physically meaningful particles, i.e. no generator internals, no non-measurable particles
- Be generator independent
- Support the user: automatic histogram booking, modules for common tasks, plot customisation, hide all the nasty bookkeeping, provide plotting tools, . . .
What’s in an analysis

- **Code:** standard event loop (init, analyze, finalize). The analyze() method for most analyses is shorter than 50 lines.

- **Data:** numerical version of plots, taken straight from Hepdata

- **Plot info:** default plot options, i.e. axis labels, plot titles, ranges, . . .

- **Analysis info:** reference to paper, abstract, beam information, MC run information, . . .
Every analysis paper is ambiguous – if you don’t think so, try reproducing a random analysis.

Typically the knowledge is lost when the PhD student leaves.

Implementing the analysis in code means resolving the ambiguities – and in fact makes the data available for further studies like model comparisons, Monte Carlo validation, comparing measurements from different experiments, . . .
Summary

- Rivet is a general MC analysis tool.

- It already has proven very useful for conserving knowledge about analysis details.

- Already supported/used by the LHC experiments (to different degrees).