

# 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, ...

# Rivet as analysis archive

- *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).