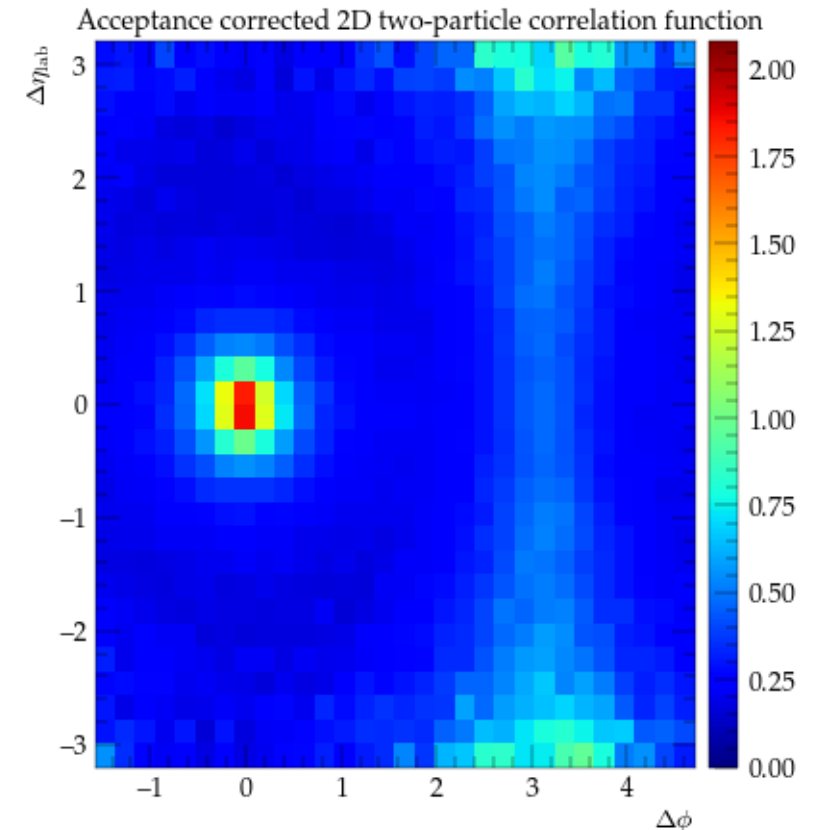


# Enhancing the Plotting Functionality in MCnet/Rivet

Simon Thor

- Rivet is a program used to test and develop particle physics simulations
- Generates plots using Python scripts and LaTeX
- **Cons: depends on LaTeX, difficult to maintain**
- **Goals:**
  - LaTeX  $\rightarrow$  matplotlib
  - Rewrite code to be modular
- Full report: <https://simonthor.github.io/GSoC-2021/>

Example plot created with Rivet (old backend)



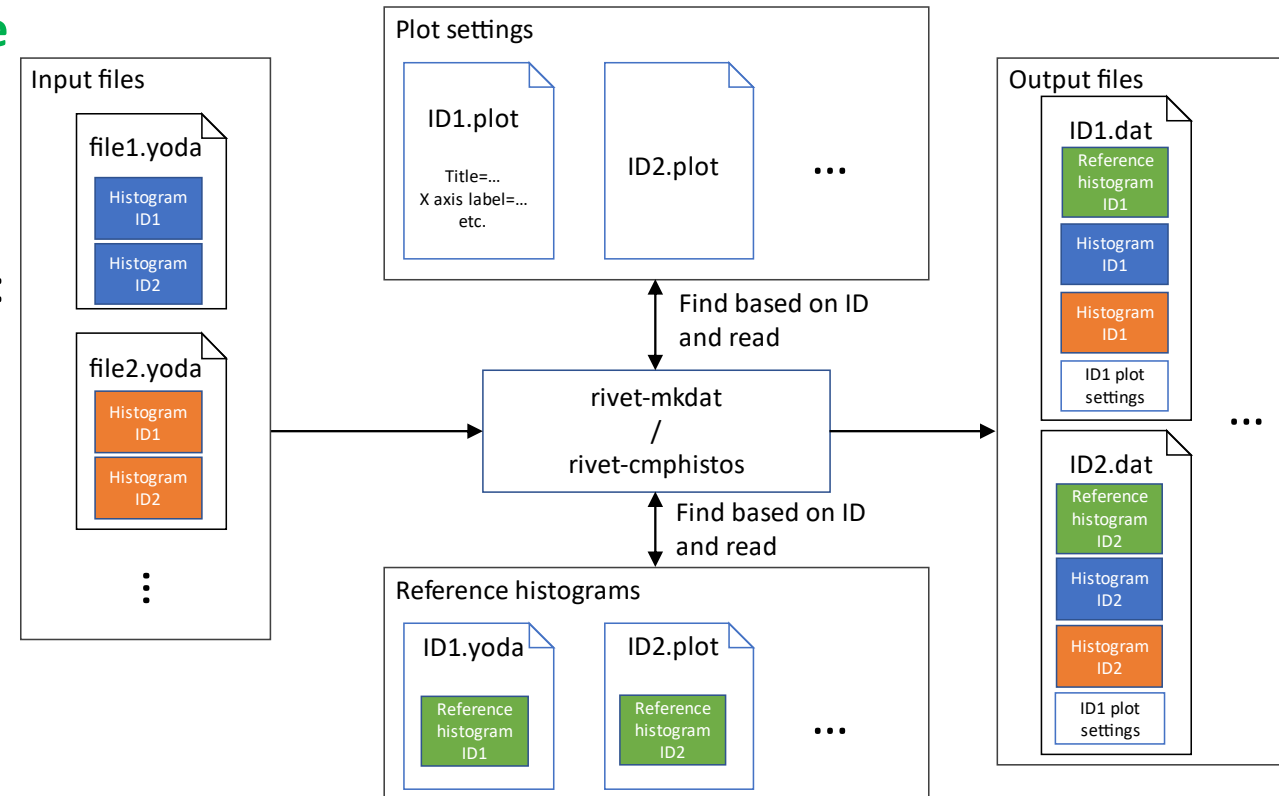
# Task 1: Rewrite rivet-cmphistos

- rivet-cmphistos is a Python script that combines and organizes the data that will be plotted

## Accomplished:

- Changed input file format from custom format to YAML syntax for **better readability**
- Rewrote code to be modular and **more maintainable**

Schematic showing the functionality of rivet-cmphistos:

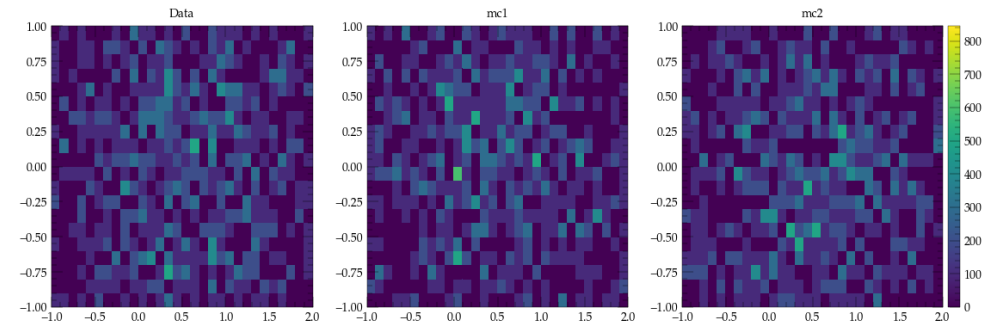


# Task 2: Plotting 2D histograms

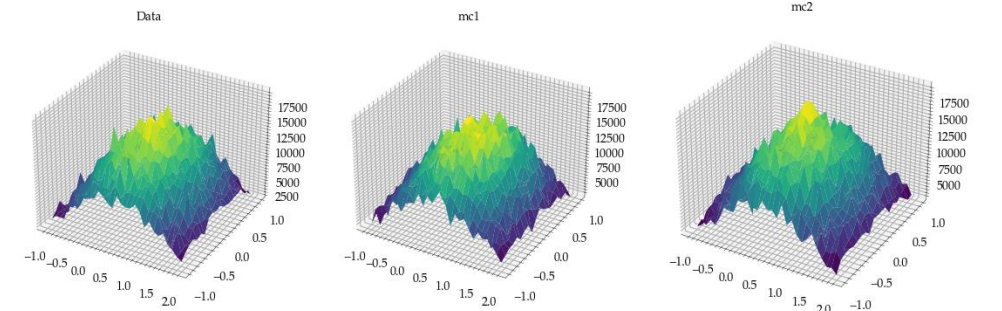
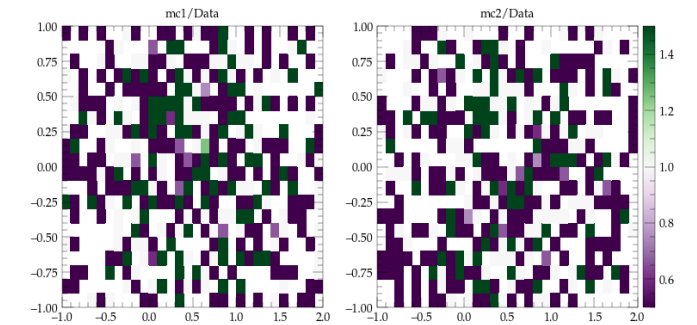
- Rivet had limited support for 2D histograms before
  - **No ratios** between 2D histograms
  - **Only heatmaps**

## Accomplished:

- Rewrite code to use matplotlib
- **Modular code**
  - General plotting API
  - Rivet-specific styling
- Support for **heatmaps** and **surface plots**
- **Ratio plots** for 2D histograms



Heatmap examples:



Surface plot examples:

