

# Physics with Rivet v1

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All infos are in [DESY cloud](#).

A documentation on Rivet you will find on <http://projects.hepforge.org/rivet/>.

We'll assume, you have done the Rivet warm-up exercise and know how to run Rivet on a hepmc file and produce distributions.

## pp collisions

1. Use  $e^+e^-$  scattering and plot  $1/N dn/d\eta$  as well as  $1/N dn/d\cos\theta$ 
  1. why are the distributions peaked at different values (around 0 for  $dn/d\eta$  and around  $\pm 1$   $dn/d\cos\theta$ ) ?
2. Use  $pp \rightarrow e^+e^- + X$  and plot  $1/N dn/d\eta$  as well as  $1/N dn/d\cos\theta$ 
  1. how are the distributions, why are they different from  $e^+e^-$  ?
  2. plot  $p_T$  of the  $e^+e^-$  pair (check influence of parton shower)
3. Use  $pp \rightarrow X$  (low  $p_T$  process, minimum bias) and plot  $1/N dn/d\eta$ 
  1. how are the distributions ?
  2. check the influence of parton shower and MPI

## ep collisions

1. Use  $ep \rightarrow e' X$  and plot  $x, Q^2, y$  and  $1/N dn/d\eta$  (excluding the scattered electron)
  - use lab frame
  - boost to hadronic center-of-mass frame (how different are distributions)
    - why are they different ?