JAM3D

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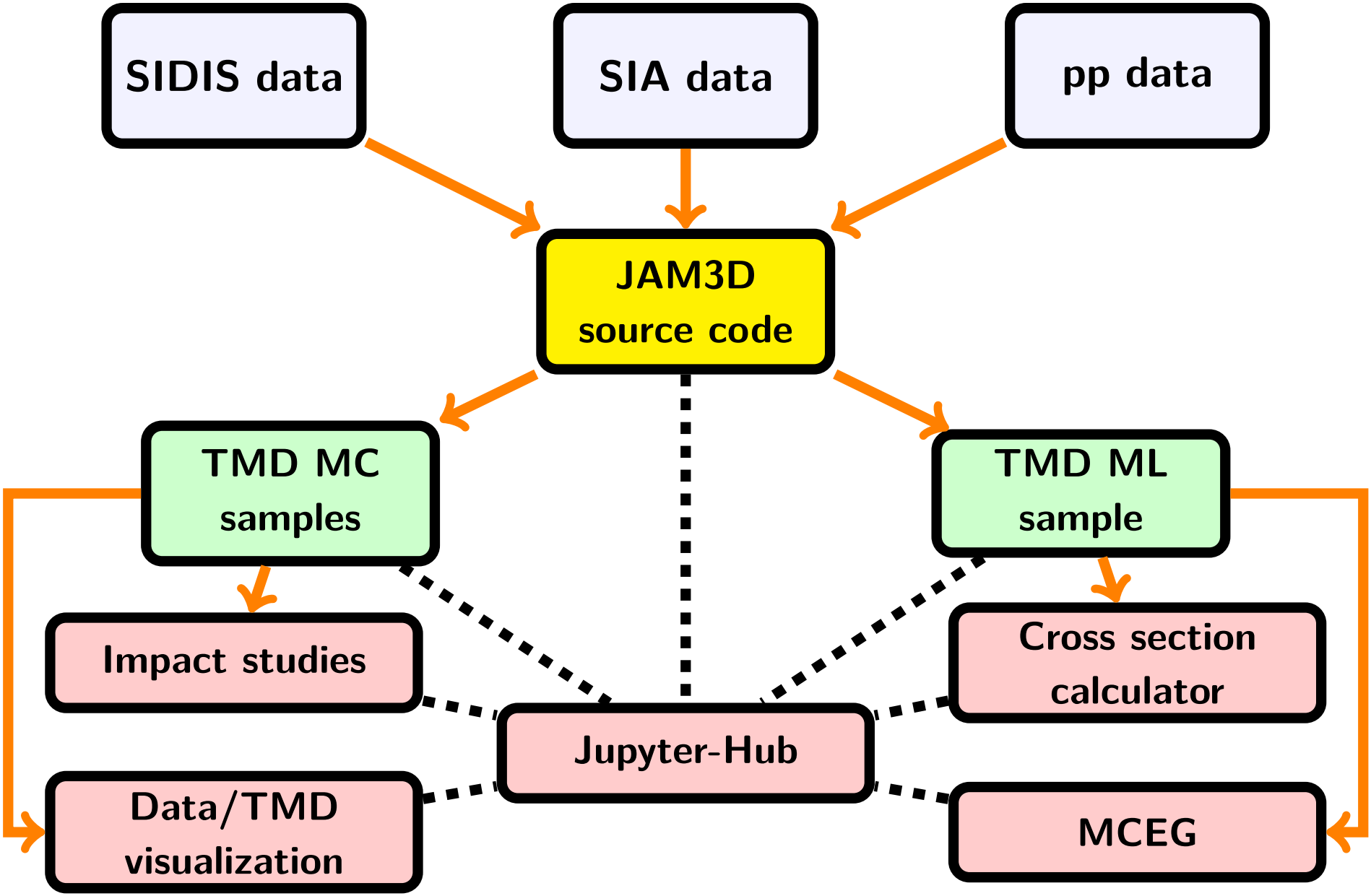
Project Scope

- **TMD fits**
  - + single fits $\rightarrow$ Maximun Likelihood (ML)
  - + MC fits $\rightarrow$ Nested Sampling (NS)
- **Impact studies for future measurements**
  - + Reweighting MC samples with new pseudo data sets
- **Data visualization**
  - + Dedicated data vs theory visualization
  - + TMD plotter
- **Cross section simulation**
  - + Evaluation of cross sections
  - + Single particle MCEG

Road Map


SIDIS data
SIA data
pp data
JAM3D
source code
TMD MC
samples
TMD ML
sample
Impact studies
Cross section
calculator
Jupyter-Hub
Data/TMD
visualization
MCEG

TMD fitter

- **Features**
  - + Fast evaluation of residuals $\rightarrow$ powered by dedicated parallelization scripts (based on ZMQ)
  - + Parallelization can take advantage of cluster enviroments:
    - JLab HPCs
    - Amazon web services (AWS): EC2, ECS via docker images
  - + Modularized framework. Easy to incorporate new observables
- **Methodologies**
  - + Maximun likelihood analysis (ML)
    - Terminal based ("input.py") + jupyter-notebooks
    - Also via jupyter-notebook (useful for jupyterhub enviroments)
  - + MC analysis based on Nested Sampling (NS)
    - Terminal based ("input.py")
    - Ideal to run on a cluster enviroment

Impact studies for future measurements

- **Methodology**
  - + Simulation of new observables based on existing MC samples
  - + Bayesian reweighting $\rightarrow$ fastest implementation
- **MC samples repository**
  - + Dedicated TMD MC parameter samples generated from existing data
  - + Access to the input files for the MC samples in case new samples are need within a different setup (change in parametrization, TMD theory, etc.)
  - + Dedicated jupyer-notebooks templates for simulation and impact studies
- **Jupyter-hub frontend**
  - + No local software installation
  - + Dedicated jupyer-hub server packed with JAM3D + MC samples repositories
  - + Users needs to upload jupyter-notebooks from from repository

Data visualization

- **Gallery of TMD studies**
  - + Dedicated repo for jupyter-notebooks to display:
    - data vs theory
    - 2D, 3D TMDs plots (nucleon imaging)
- **Jupyter-hub frontend**
  - + No local software installation
  - + Dedicated jupyer-hub server packed with JAM3D + MC samples repositories
  - + Users needs to upload jupyter-notebooks from from repository

Cross section simulation

- **Features**
  - \+ Dedicated jupyter-notebooks for cross section evaluation
  - \+ Dedicated jupyter-notebooks for single particle event generator
- **Jupyter-hub frontend**
  - \+ No local software installation
  - \+ Dedicated jupyer-hub server packed with JAM3D + MC samples repositories
  - \+ Users needs to upload jupyter-notebooks from from repository