

WHIZARD 1.95 → WHIZARD 3.1.7

Migration on IHEP server, validation, and minimal user workflow

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From production package to runnable package

WHIZARD 1.95 / whizardais

- Runtime on IHEP: usually enters through a CentOS7 container
- Environment, build, generation, and submission are coupled
- Covers many channels and several workflow entry points
- User-facing steps are buried inside production logic

WHIZARD 3.1.7 / Whizard3_at_IHEP

- Runtime on IHEP: direct on AlmaLinux9/CentOS9-like nodes
- Shared installation is separated from the repository
- Keeps one documented default route for teaching and validation
- Better maintained ISR implementation for lepton beams

Main simplification

Moving shared software out of the git package changes the tracked scale from 16 \rightarrow 7 files and 1326 \rightarrow 345 lines, while the main $e^+e^- \rightarrow \mu^+\mu^-$ target is preserved.

Why upgrade

Physics motivation

- WHIZARD 3.0.3 release notes: *complete implementation / validation of NLL electron PDFs*
- WHIZARD 3.1.1 release notes: *bug fix for kinematic mapping of s-channel resonances*
- Our target is the Z-pole process $e^+e^- \rightarrow \mu^+\mu^-$, where ISR and resonance mapping matter most

Operational motivation

- We need a current-node path instead of a container-dependent legacy route.
- Teaching and validation need a git package that exposes the runnable steps directly.
- Students should learn one default workflow, not production-era branching.

Sources: [WHIZARD releases](#), [Q#703485](#), [Q#709215](#), [Q#709593](#).

IHEP deployment model for WHIZARD 3

Maintainer-prepared shared layer

- Shared OCam1 4.14.2 in CEFS
- Shared WHIZARD 3.1.7 in CEFS
- Prepared once by the maintainer, not by students

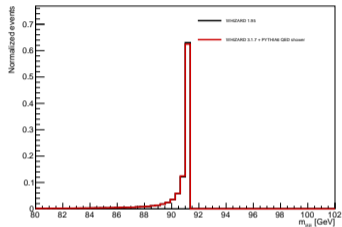
User-facing repository layer

- `setup.sh`, example inputs, and `run_legacy_e2e2.sh`
- Primary target: reproduce $e^+e^- \rightarrow \mu^+\mu^-$ at the Z pole
- Also provide two 240 GeV examples

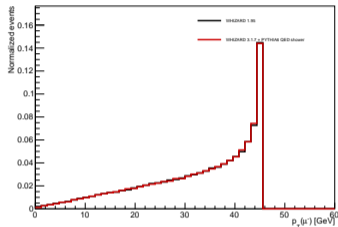
Default wrapper contract

- Keeps old-style StdHEP output, split-output pattern, and directory naming
- One validated default route for the Z-pole example
- Fixed split: $200000 = 100 \times 2000$

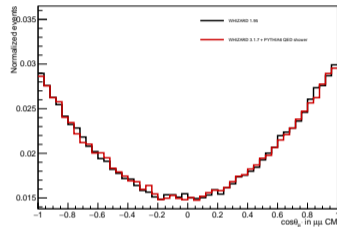
Validated truth-level comparison



$m_{\mu\mu}$



$p_T(\mu^-)$



$\cos\theta_{\mu^-}$ in $\mu\mu$ CM

Takeaway

Overlay of 198000 old events and 200000 new events: the default WHIZARD 3.1.7 route reproduces the old WHIZARD 1.95 truth-level shapes for $m_{\mu\mu}$, p_T , and $\cos\theta$.

Minimal commands

- 1 Clone the repository

```
git clone https://code.ihep.ac.cn/  
shuohan/Whizard3_at_IHEP.git
```

- 2 Enter the package and load the environment

```
cd Whizard3_at_IHEP ; source setup.sh
```

- 3 Run the main example

```
N_EVENTS=200000 ./run_legacy_e2e2.sh test_run
```

- 4 Output goes to the old-style directory

```
test_run/data/2fermions/.../
```

Students no longer need

- no CentOS7 container
- no `mkproc.sh`
- no local compilation

Main idea

- one shared installation
- one git repository
- one example script

Main conclusions

- Upgrading to WHIZARD 3.1.7 is motivated by both physics and maintenance.
- The new repository is much smaller and cleaner, but it still preserves the main production target and old-style StdHEP output.
- The default $e^+e^- \rightarrow \mu^+\mu^-$ route is now validated.
- With that route, the migrated WHIZARD 3.1.7 sample reproduces the old WHIZARD 1.95 truth-level shapes for $m_{\mu\mu}$, p_T , and $\cos\theta$.
- This is sufficient for slides, tutorial use, and the default repository example.