REPACKAGING
JET SUBSTRUCTURE
OBSERVABLE TOOLS

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What is PACKAGING ?

Bundling libraries, modules, or applications with (ideally) all necessary dependencies, metadata, and documentation.

PORTABLE + **TRACEABLE** + **EFFICIENT** =

GOOD FOR SCIENCE!

What happens when packages get old?

REPACKAGING JET SUBSTRUCTURE OBSERVABLE TOOLS

PACKAGING:
Bundling libraries, modules, or applications with (ideally) all necessary dependencies, metadata, and documentation.

3

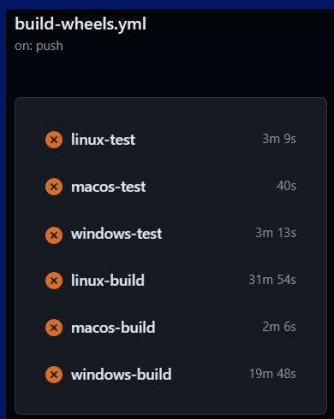**What happens when packages get old?**

Dependencies change

Hardware capabilities change

Logic changes

What does it look like when dependencies break?
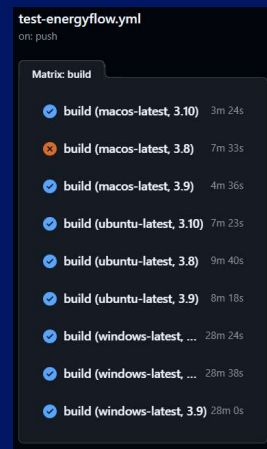
Nothing works

build-wheels.yml
on: push

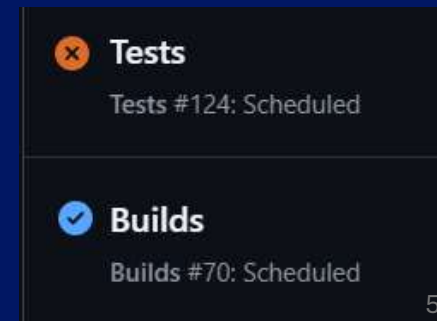| ⊗ linux-test | 3m 9s |
⊗ macos-test	40s
⊗ windows-test	3m 13s
⊗ linux-build	31m 54s
⊗ macos-build	2m 6s
⊗ windows-build	19m 48s

Some things work

test-energyflow.yml
on: push

Matrix: build

✓ build (macos-latest, 3.10)	3m 24s
⊗ build (macos-latest, 3.8)	7m 33s
✓ build (macos-latest, 3.9)	4m 36s
✓ build (ubuntu-latest, 3.10)	7m 23s
✓ build (ubuntu-latest, 3.8)	9m 40s
✓ build (ubuntu-latest, 3.9)	8m 18s
✓ build (windows-latest, ...	28m 24s
✓ build (windows-latest, ...	28m 38s
✓ build (windows-latest, 3.9)	28m 0s

Everything LOOKS like it works

| ⊗ **Tests** |
| Tests #124: Scheduled |
| ✓ **Builds** |
| Builds #70: Scheduled |

5

REPACKAGING
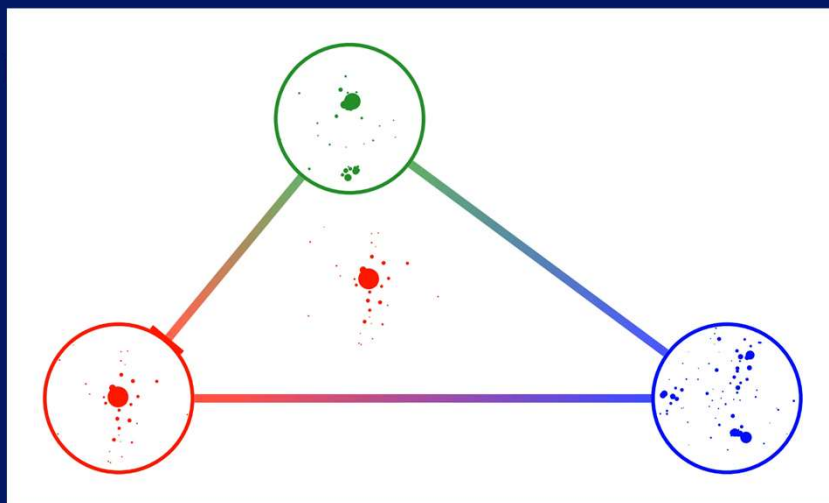# JET SUBSTRUCTURE
OBSERVABLE TOOLS

CI/CD overhaul
- Automate with GitHub actions
- Resolve incompatibilities

setuptools → scikit-build-core → hatchling
- Simplify build
- Expose further code rot

CI/CD *continuous integration/continuous distribution*

REPACKAGING JET SUBSTRUCTURE OBSERVABLE TOOLS

- **Wasserstein**

https://github.com/thaler-lab/Wasserstein

- **EnergyFlow**

https://github.com/thaler-lab/EnergyFlow

wasserstein distance
a distance metric used to evaluate probability distributions

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- **Wasserstein**

  https://github.com/thaler-lab/Wasserstein

- **EnergyFlow**

  https://github.com/thaler-lab/EnergyFlow

Coming soon!

```
pip install Wasserstein
conda install Wasserstein
pip install EnergyFlow
conda install EnergyFlow
```

References

ATLAS Collaboration. Measurements of multijet event isotropies using optimal transport with the ATLAS detector. 2023. arXiv: 2305.16930 [hep-ex].

Patrick T. Komiske and Eric M. Metodiev and Jesse Thaler. *EnergyFlow.network*. 2020. Retrieved April 24, 2024, from https://energyflow.network/.

Patrick T. Komiske and Eric M. Metodiev and Jesse Thaler. *The Hidden Geometry of Particle Collisions*. 2020. arXiv: 2004.04159 [hep-ph].

Patrick T. Komiske and Eric M. Metodiev and Jesse Thaler. *The Metric Space of Collider Events*. 2019. arXiv: 1902.02346 [hep-ph].

THANK YOU!