NUISANCE HEPDATA Requirements

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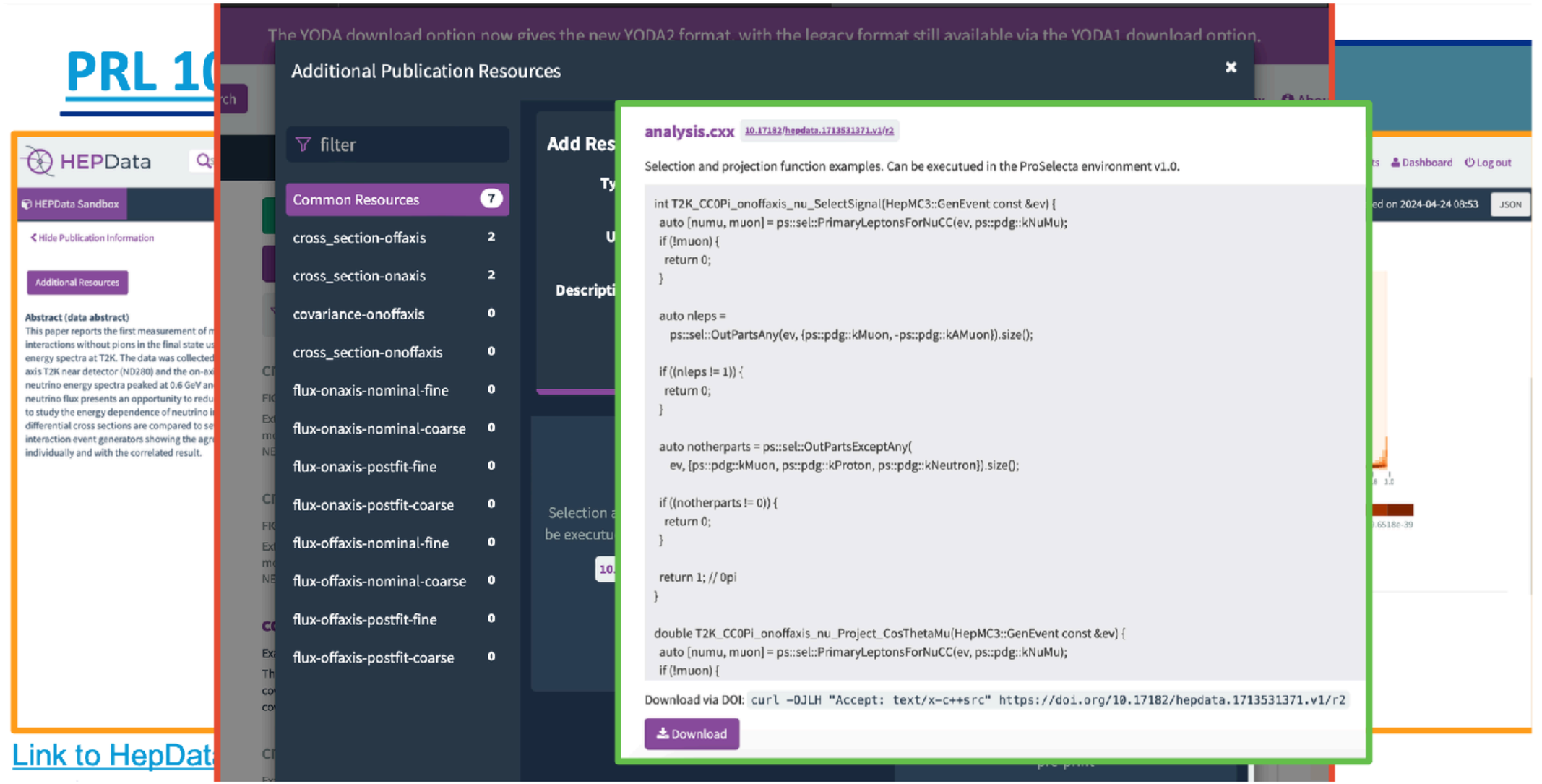
Summary

- Pushing the accelerator neutrino community to adopting HEPDATA and HEPMC3 as standards for neutrino cross-section generator comparisons.

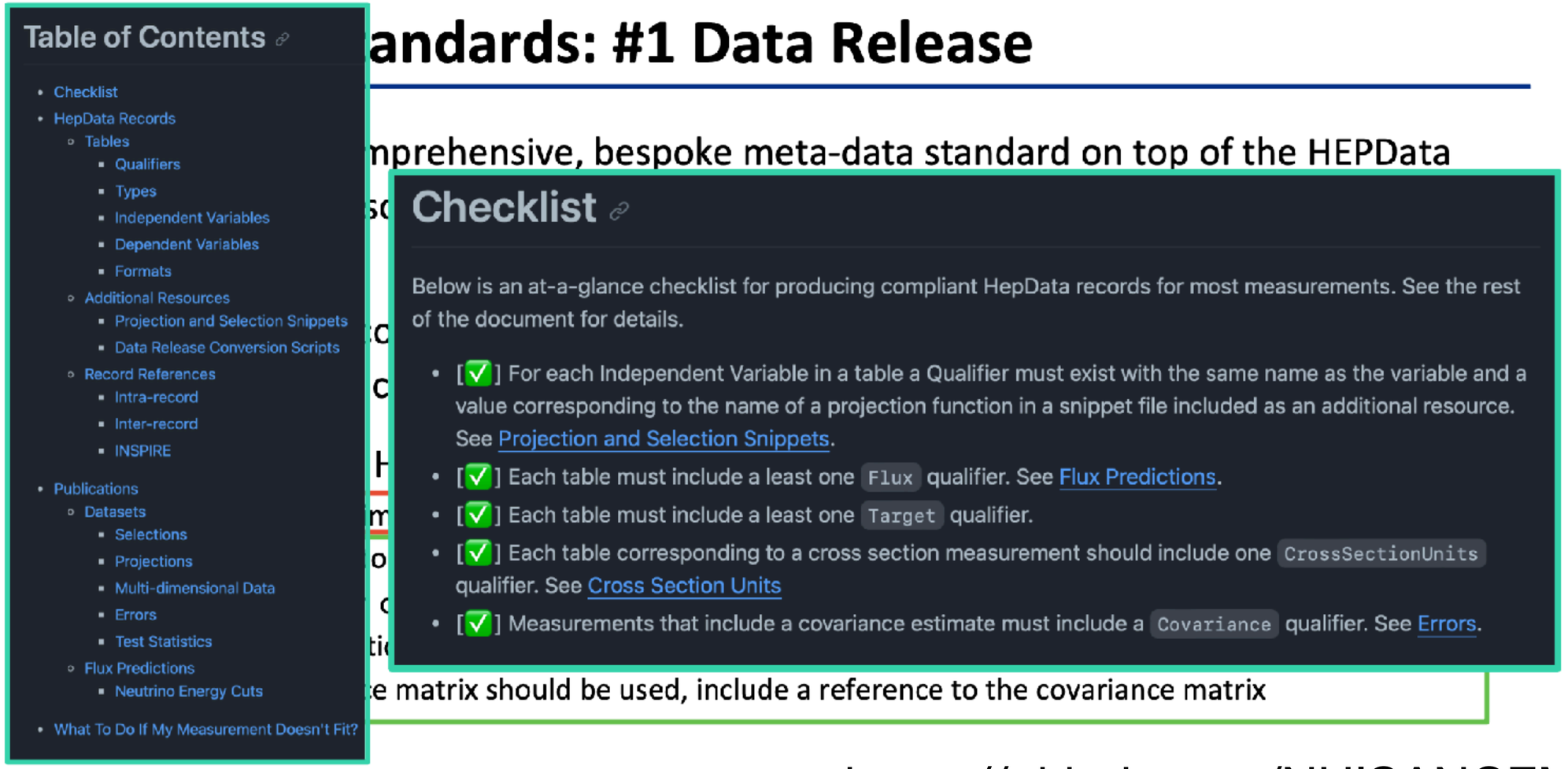
- NUISANCE is a neutrino generator comparison tool similar to rivet, but designed specifically for the needs of the neutrino community (generator reweighting, multiple input flux handling, projection and forward folding smearing tools).

- Developing NUISANCE3, complete rewrite of existing NUISANCE framework to support automated data analyses with HEPDATA. Goals:
  - Analysers upload data release
  - Analysers upload a standardised analysis code based on HepMC3 (+ProSelecta tool)
  - Analysers link all necessary information for comparison (flux, likelihood method, etc)
  - NUISANCE3 downloads direct from HEPDATA and builds analysis.

Analysis Snippets



Requirements



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andards: #1 Data Release

mprehensive, bespoke meta-data standard on top of the HEPData

Checklist

Below is an at-a-glance checklist for producing compliant HepData records for most measurements. See the rest of the document for details.

- [✅] For each Independent Variable in a table a Qualifier must exist with the same name as the variable and a value corresponding to the name of a projection function in a snippet file included as an additional resource. See Projection and Selection Snippets.
- [✅] Each table must include a least one `Flux` qualifier. See Flux Predictions.
- [✅] Each table must include a least one `Target` qualifier.
- [✅] Each table corresponding to a cross section measurement should include one `CrossSectionUnits` qualifier. See Cross Section Units
- [✅] Measurements that include a covariance estimate must include a `Covariance` qualifier. See Errors.

e matrix should be used, include a reference to the covariance matrix

https://github.com/NUISANCEMC/HEPData

Flux Linking

- Setup reference resolution tools that allow inter-table linking between different HEPData Records.
  - probe_flux = [inspire123456]/MicroBooNE_flux:flux_numu[1],flux_nue[0.9]
- Allows someone to ask a generator like NEUT to atomically produce an MC file for a given experiment in a single line.
- Major issue is historic data pre-2000 typically doesn't have nice flux table publications.
  - Some bubble chamber flux files digitised from talks as not realised in original publication.
  - In some experiments flux/target info sent to us by the original analysers.
  - Some recent experiments also have flux released in another OA paper, and permission to upload this to HEPdata will be very drawn out. Requires decision on OA contour data releases, etc.
- **Need** the ability to have HEPData records added without a corresponding inspirehep ID.
- Is there a way that specific archiving groups (i.e. NUISANCE) could have privileged users who are responsible for vetting these non inspire-hep ID collections?