

# Pythia6-for-EIC Reunification

Goal: **One** authoritative distribution, at [gitlab.com/eic/mceg/PYTHIA-RAD-CORR](https://gitlab.com/eic/mceg/PYTHIA-RAD-CORR) (or on github)

Since then, changes on the /afs version in only one file, **pygaga.f**:

- Changes by Liang, 02/2020 "fix low E out e- info" in the y, theta cut section

```
+ C liang-02/2020 fix low E out e- info +++++++
+ C          RAT=((1D0-X(I))*Q2(I)-X(I)**2*PMS(I))/
+ C    &      ((1D0-X(I))*2*(VINT(302)-2D0*PMS(3-I)-2D0*PMS(I)))
+          eLcms=sqrt(VINT(5)**2+PMS(I)) !incoming lepton energy
+          eLpcms=eLcms*(1-X(I)) !out lepton energy
+          pLcms=VINT(5) !incoming lepton momentum
+          pLpcms=sqrt(eLpcms**2-PMS(I)) !out lepton momentum
+          RAT=(2*pLcms*pLpcms-2*eLcms*eLpcms+Q2(I)+
+    &        2*PMS(I))/(4*pLcms*pLpcms)
```

Impacts probably only a very small region of phase space.

→ Can be incorporated with one git merge

Sylvester has a version with many quality-of-life changes, notably a replacement for CERNLIB.

- Basis for Wouter's spack version.
- Based on a 10+ year old version and doesn't contain many improvements.

→ **Should not be used for EIC**

Sylvester agrees; in fact, it doesn't seem to have been used for that since out of the box it shouldn't work and he hasn't gotten any complaints

→ **Retire and salvage for parts**

Wouter, can I help changing the spack package?

# Other Considerations

Compared to the version distributed in BeAGLE:

Six differing files

`pygaga.f`, `pydiff.f`,  
`pypdfu.f`, `pysigh.f`,  
`pysspa.f`, `pyxtot.f`

- Changes can be viewed [here](#)
  - Needs more careful review whether these BeAGLE-specific changes can be made part of the unified distribution
  - and whether they change the e+p case
- **Contacted Mark, Elke**

Showing 6 changed files with 119 additions and 43 deletions

> [src/pythia/pydiff.f](#)

> [src/pythia/pygaga.f](#)

> [src/pythia/pypdfu.f](#)

> [src/pythia/pysigh.f](#)

> [src/pythia/pysspa.f](#)

> [src/pythia/pyxtot.f](#)

Other packages (like DJANGO) specifically use **stock pythia6** with no changes

→ **No action needed**

Some questions/options along the way:

- Will try to add in some functionality from Sylvester
- Any action needed for RNG?
- Will need a (probably stand-alone) FXT version
- Change name to pythia6-eic or so?

