

# QCDNUM QCD+QED evolution

Work in progress

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# QCDNUM Toolbox upgrade

- For QCD+QED we need to evolve 12 pdfs with 4 of them coupled
- Idea: write an evolution toolbox where the user can feed-in the splitting functions, perturbative expansion coefficients, and do n-fold coupled evolutions

# QCDNUM tools

Memory management (extended functionality)

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Coupled evolution tool (new)

# Memory management

- Partition a local store  $w(\text{nwords})$
- Create tables of weights,  $\text{pdfs}(\text{new})$  and  $\alpha(\text{new})$

$$\text{call MAKETAB} \left\{ \begin{array}{l} w(x), w(x, n_f), w(x, \mu^2), w(x, \mu^2, n_f) \\ f(x, \mu^2) \\ \alpha(\mu^2) \end{array} \right.$$

- Can organise tables into  $\text{sets}(\text{new})$

# QCDNUM internal memory layout



## Another possible memory layout



# New evolution tool

Expansion coefficients

Coupled evolution

Subroutine or function	Description
<b>EVFILLA</b> ( w, id, subr )	Fill coefficient table
EVGETAA ( w, id, iq, *nf, *ithresh )	Get coefficient
<b>EVDGLAP</b> ( w, subr, idw, ida, idf, n, iq0, *eps )	Coupled evolution
EVPDFIJ ( w, id, ix, iq, ichk )	Pdf at a grid point
<b>EVPLIST</b> ( w, id, x, qmu2, *pdf, m, ichk )	Pdf interpolation
<b>EVPDFXQ</b> ( w, id, x, nx, q, nq, *table, ichk )	Pdf interpolation
<b>EVFCOPY</b> ( w, id, def, nf, iset )	Copy to internal memory

Output arguments are prefixed with an asterisk (\*).

PDF interpolation

Copy to internal memory

# Joblist

- ✓ Coupled evolution routine (FFNS, forward only)
- ✓ New memory layout
- Upgrade internal memory (in progress)
- User interface ([evdglap](#))
- First beta release 17-01-0b
- Backward evolution, VFNS
- ✓ Updated write-up

# Outlook

No showstoppers up to now

Tedious development because I want to keep all existing user interfaces backward compatible

Slow progress in baby-steps to not break the code and loose control