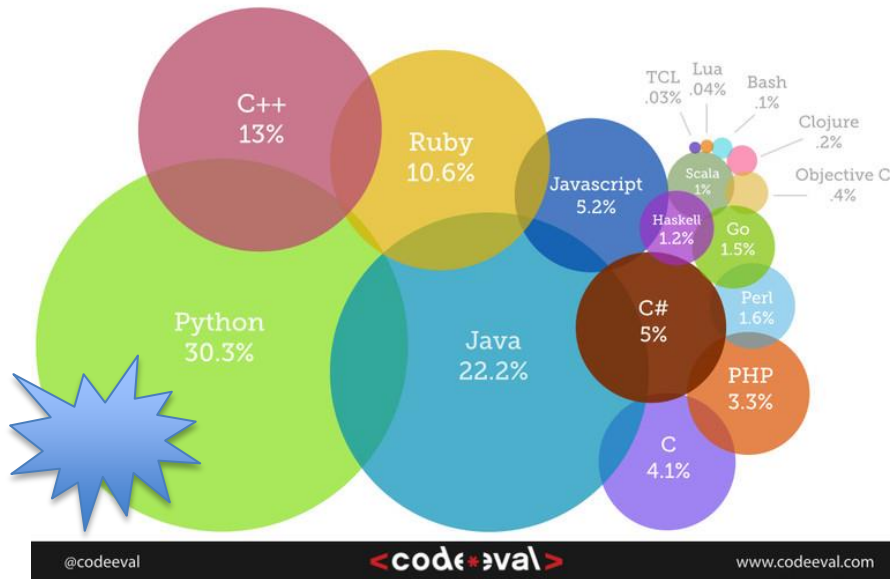# heppy

A lightweight python event processing
framework for high-energy physics

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Why python?

Most Popular Coding Languages of 2014

- Very large user base
- Super easy to learn
- Light & short code
- Good performance
  - usually drives C or C++ modules
- Feature rich
  - massive and easy-to-use standard library
- Dynamic typing
  - good for multichannel analyses
  - code highly reusable
- Productivity x 5-10 w/r C++
- Forget about ROOT CINT
- The « glue » between everything
- Just a lot of fun!

Why not python?

Some arguments against it:

- It would be slow

- No compilation??

- Still another language to learn
  - C++ was enough of a pain in the @!#

But in fact:

- Usually drives c or c++ libraries
- Huge amount of time gained
  - flexibility, high-level tools, code reusability, terse syntax

- Lots of checks done at runtime
  - Run, get exceptions, fix them

- Takes less than a few days to become efficient, and you will love this one

Heppy

- Python-based event processor for HEP
  - Input: TTree
  - Output: e.g. a flat ntuple for statistical analysis
  - Lightweight : ~2000 lines of code
- GitHub:
  - Heppy: https://github.com/HEP-FCC/heppy
  - Heppy_fcc: https://github.com/HEP-FCC/heppy_fcc
- Documentation for FCC:
  - https://twiki.cern.ch/twiki/bin/viewauth/FCC/FCCSoftwareHeppy

Users and Developers

- Used in major CMS analyses
  - H→ZZ→4 leptons
  - H→ττ
  - ttH → leptons
  - SUSY searches (≥0 leptons)
  - Top standard model analyses
  - W mass measurement
  - Particle flow performance measurements

- And for the FCC already!
  - CERN team TLEP analyses arxiv:1308.6176

- Core framework developers
  - C. B. (CMS), 2011
  - Giovanni Petrucciani (CMS), 2014
  - Andrea Rizzi (CMS), 2014
  - Non-CMS people welcome ☺

- Lots of new features being proposed and explored at the moment.

Short demo if network allows

- To get started, follow:

  - The python tutorial if not yet done (5 hours)
    https://docs.python.org/2/tutorial/

  - The FCC heppy documentation (1 hour)
    https://twiki.cern.ch/twiki/bin/viewauth/FCC/FCCSoftwareHeppy