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Mathematician in charge of the development of PyLongitudinal, a code written in Python by several developers at Cern for the simulation of longitudinal beam dynamics with collective effects in synchrotrons; PyLongitudinal is a part of a project called PyHeadtail in which the idea is to create one bigger code that can be used for both longitudinal and transverse tracking.

Link of PyLongitudinal on GitHub <https://github.com/like2000/PyHEADTAIL/tree/PYlongitudinal>

PAST AND CURRENT SITUATION

The main features of the code (v1.2.3. at the moment) are:

- Different initial distributions not matched and matched with intensity effects
- Tracking in phase space
- Several plot methods and saving of the beam statistics and data
- Beam acceleration through a momentum program
- Multi-section and multi-system cases
- Collective effects in time and frequency domain
- Generation of RF noise from noise spectrum
- Code optimisation (precalculation, h5 files, cython, beta version of tracking module parallelised)

In addition, as an application, I have recently used this code to simulate the effects of the introduction of the new Finemet cavities in the PS Booster.

IN THE NEXT FUTURE...

- Use of parallelisation to optimise the code, in particular for the treatment of multibunch instabilities
- Interface with the transverse branch of the PyHeadtail project
- Further studies and simulations directed towards the PSB machine