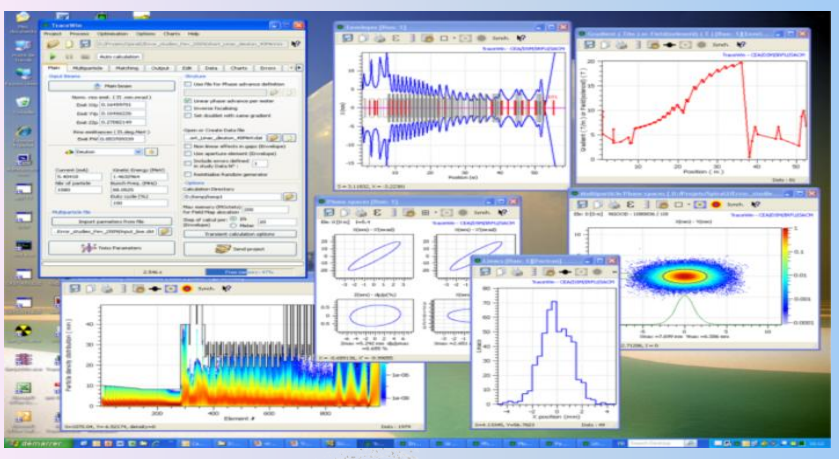
Review of Proton Linac Beam Dynamic Simulation Code

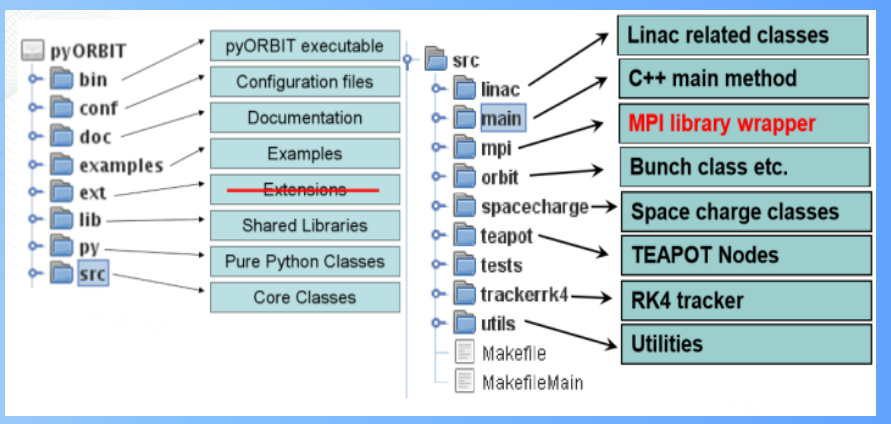
Xinyuan.Feng†, Jun.Peng, Institute of High Energy Physics (IHEP CSNS), Dongguan, China

CSNS-II project design a linac accelerate 40mA H- beam from 3.8MeV to 300MeV, which should not only overcome the spacecharge effect at low energy, but also have high efficiency at high energy. Therefore lots of simulation studies should be done on a variety of codes.

The TraceWin code is development by The French Alternative Energies and Atomic Energy Commission (CEA) has been one of the most famous linac beam dynamic simulation codes. The code has been refined for 20 years and is still evolving. The simple navigating interface and good interaction could lead the whole system to a better user experience, detailed manual make it easy to learn and operate this code. Built-in examples show users the basic use of the software, like adjust input beam, track RFQ and DTL cavities, apply chopper and solenoid in linac lattice. This is a measure to make the TraceWin code more novice friendly.



Based on origin ORBIT code, ORNL developed a new simulation code PyORBIT. As descendant of ORBIT code, PyORBIT has the two language structure: Python as driving scripting shell and C++ as underlying code. The different with TraceWin is that PyORBIT is open source, which makes this code more flexible and has more possibilities, and everyone can download the source code from github.



In general, TraceWin is more friendly for users, provide efficient calculate power and simple result presentation ability. And PyORBIT is more flexible, maybe getting started is more difficult, but have more possibilities. They are both very useful simulate codes and we can choose according to personal preference.

Reference:
[1]STATUS OF TRACEWIN CODE doi:10.18429/JACoW-IPAC2015-MOPWA008
[2]https://github.com/pyorbit-collaboration/py-orbit
[3]BEAM DYNAMICS SIMULATIONS USING A PARALLEL VERSION OF PARMILA

Institute of High Energy Physics
Chinese Academy of Sciences