Reconstruction status

[an update since Jul meeting]

A. S.

Since July

➡ Implemented the base class of all the principal detectors in the common ROOT-based software adopted after the July meeting: currently covers the Start Counter, the Beam Monitor, the target region, the VTX detector, the Intermediate (silicon based) and Last (drift chamber) tracker, the scintillator wall and the calorimeter.

➡ DAQ can be integrated easily. A skeleton for "high level reconstruction" exercises is already available (see hands on session of Bologna sftw meeting)

➡ Finalised the installation of the software on the Bologna tier3 cluster. Instructions on how to compile and run are kept under FOOT twiki page. Exercises on MC truth can be already made.

➡ Held a software meeting in September to teach the framework basics to the interested people. Now all the sub-detector experts have what they need to start.

Ongoing work..

➡ Interface to handle the MC truth is provided and works (truth MC studies are already possibile… see slide 6).

➡ A proper implementation of the geometry setup that could be properly handled by the reconstruction software is being deployed (SM Valle - Milano). **Currently most of the geometrical parameters of the detectors are set by hand and most of them are missing or wrong: have to be updated.**

➡ Base class for Intermediate and Last tracker, for calo and scintillator wall are available but dummy. **Have to be developed from scratch.**

➡ **Interface with magnet field** is currently provided but **has to be updated** with the magnet field used in FOOT (currently provides the magnet field of a previous experiment).

Emulsions

➡ "Capire tu non puoi….Tu chiamale se vuoi…"

➡ First discussion on how to provide a simulation that could be meaningful for the emulsions study started in October (yesterday a working meeting held place in Milano).

➡ The reconstruction will go on a complete different pattern… integration with framework aims to ease efficiency/background studies..
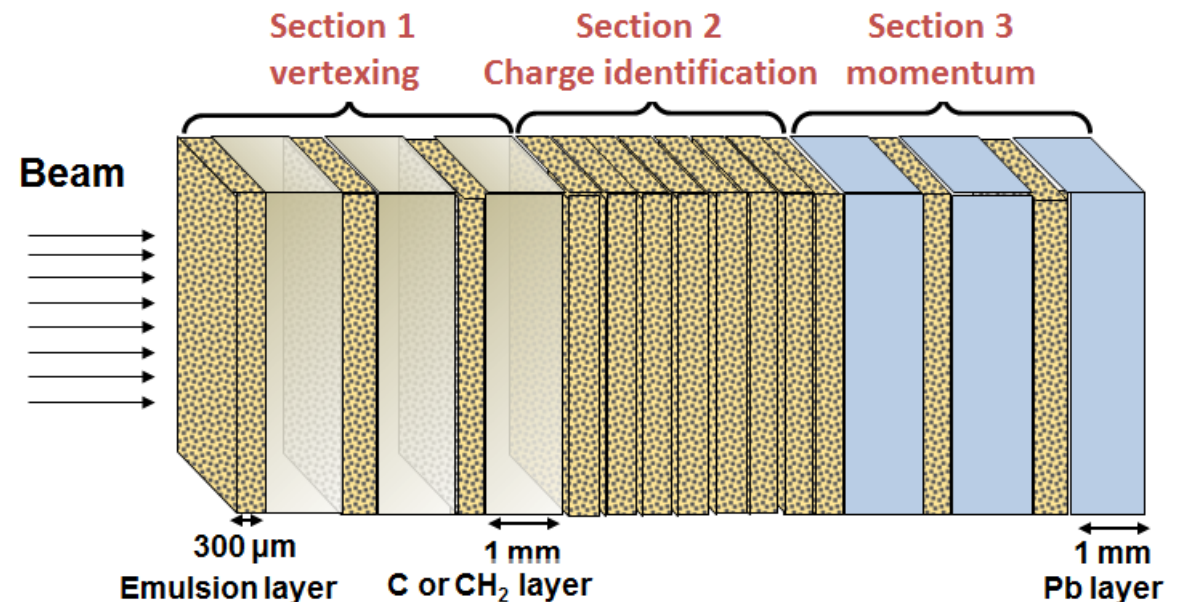
Tracking

➡ <u>Genfit integration</u> in the framework has ben tested (works both on mac and on tier3)… Will coordinate with Kalman developers to agree on a common tool

➡ Currently performing two tasks:

– **MC truth based**. Kalman based tracking in the after target trackers: see next talk from Matteo.. We will start working with constant Mag field and then switch to the full simulation provided by Sanelli.

– "**real conditions like based**". Kalman based tracking of the Beam Monitor: started an effort in Milano to track the ions in the Beam Monitor (the work could be easily ported to the after target drift chamber tracking once the design is finalised). Currently the effort is focused in the proper implementation of the geometry / materials in the genfit frameowrk to perform a Kalman fit.

Feasibility studies…

➡ Performed at MC truth level, are a valuable tool for understanding the crucial exp. aspects… (Ekin resolution, statistical uncertainty on the cross section, boost and subtraction technology issues)

➡ So far:

From E. Verdolino thesis
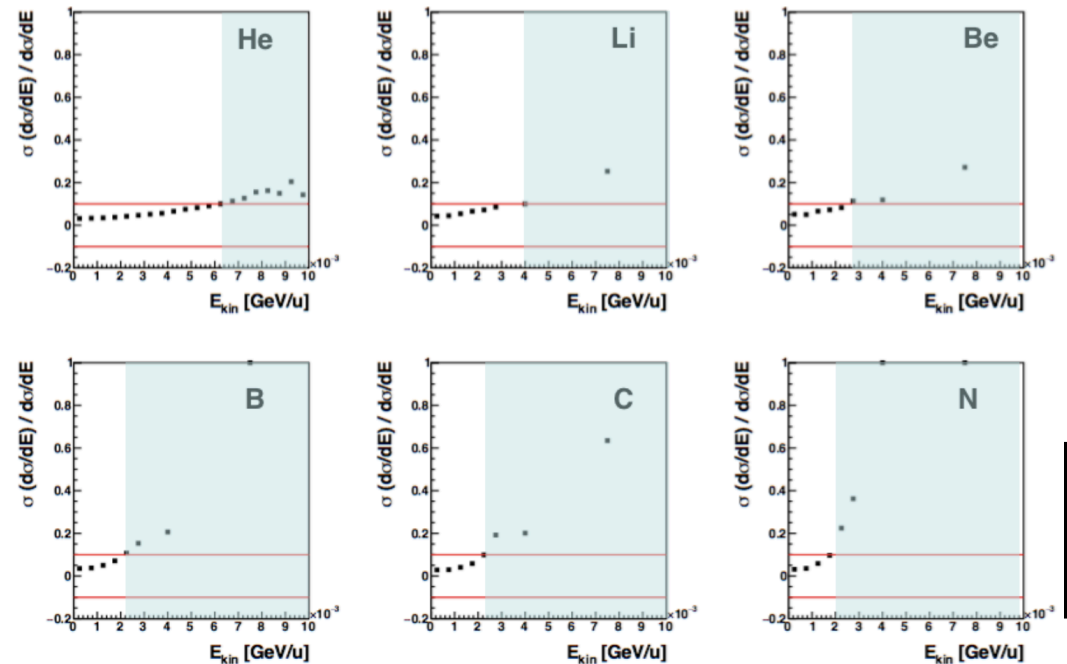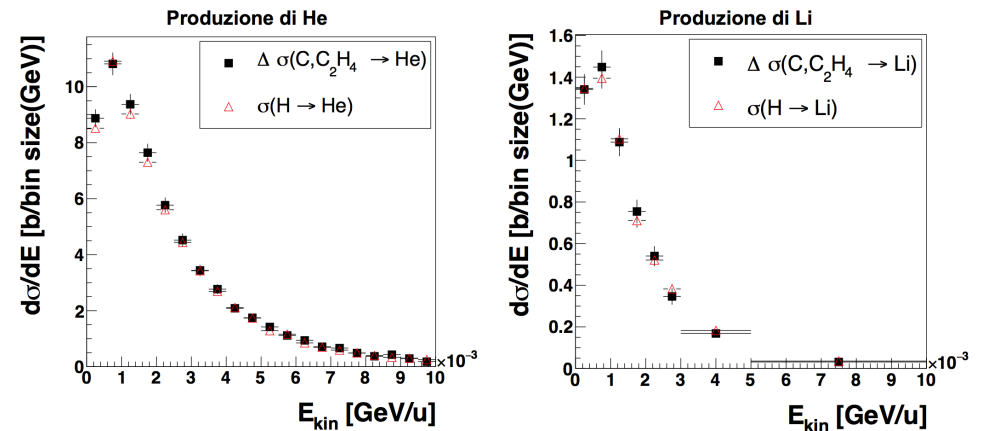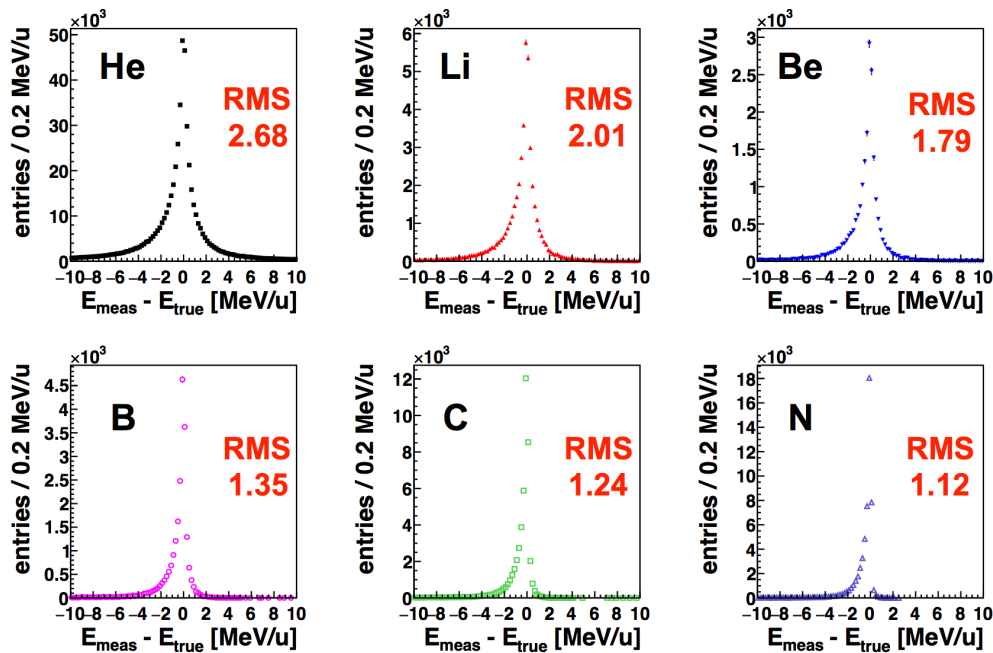
Conclusions - outlook

➡ Tools are available, enjoy them! [Really.. don't be shy!]

➡ There's a long shopping list in our cart:

  – implementing the interface with the simulation geometry/setup

  – implementing the software for each sub detector

  – implementing the global tracking

  – implementing the strategy for isotope identification from an MVA analysis

➡ Sub-detector experts should be appointed and a tentative program (including deadlines!) for deployment of detector based inputs should be agreed on…

➡ Most of CDR material could be probably finalised working in parallel with software development (does not really rely on detailed detector simulation or full reconstruction performances), however it would be really good to have a prototype of a global reconstruction when discussing the achievable FOOT global resolution and isotope identification performances.