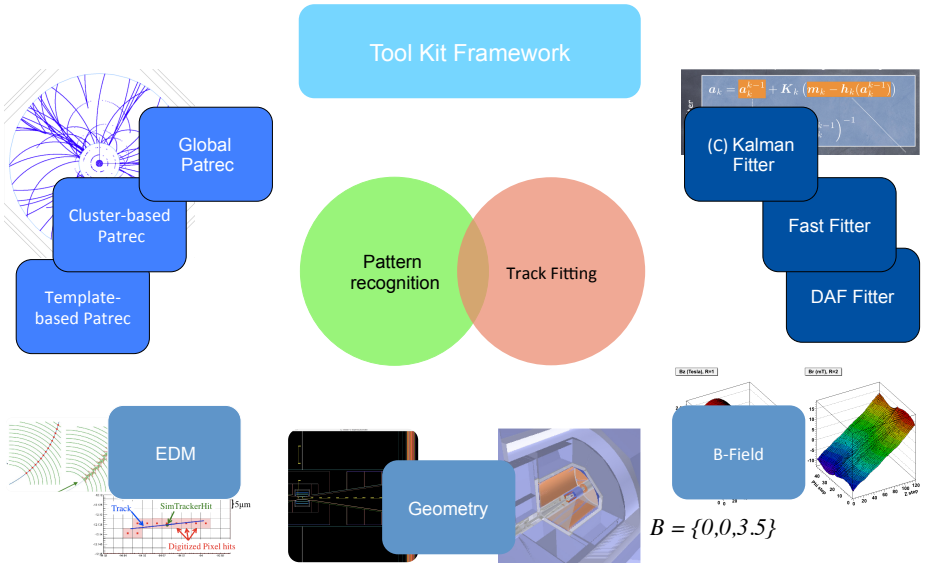
WP2::Tracking status



Ch. Rosemann

DESY

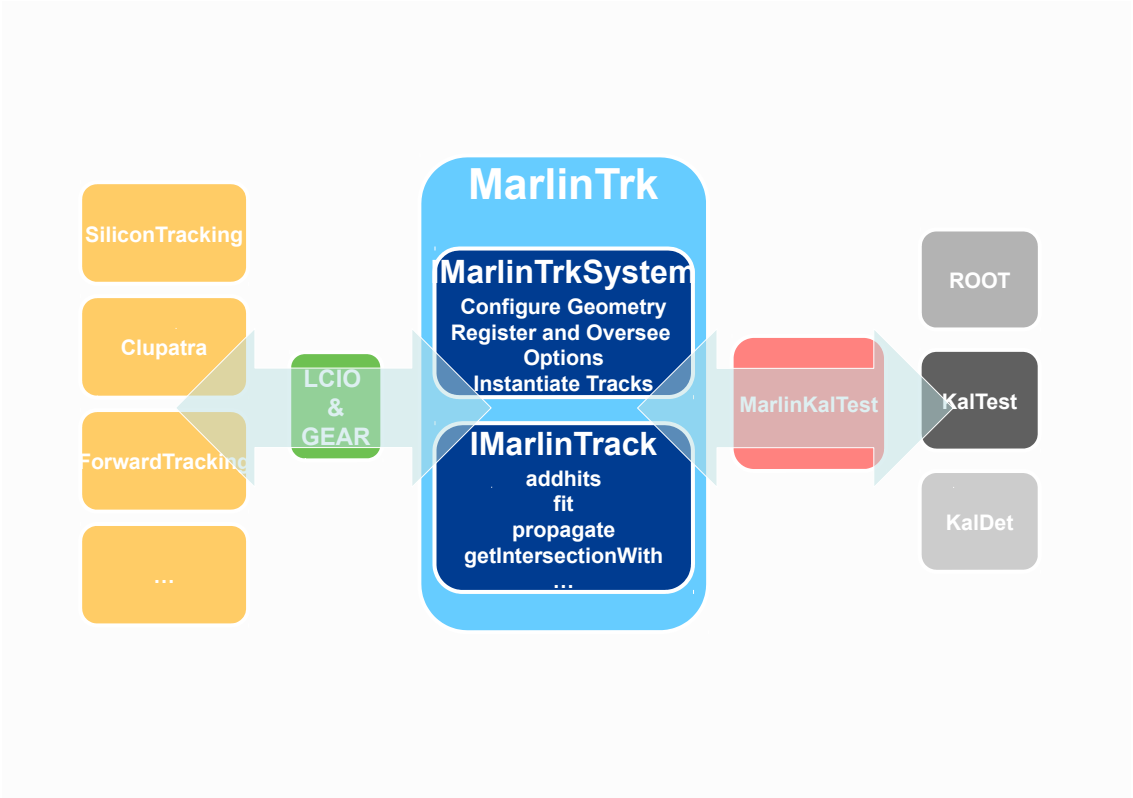
Changes

Personnel Changes

- Steve Aplin left
- Jan Engels left as well
- Oleksandr Volynets joined as DESY fellow
  Unfortunately leaves for industry at end of April
- CR joined
- $\rightarrow$ re-organization

What's there: EDM prototype

- IMarlinTrk: interface class to track fitting/parameter manipulation
- IMarlinTrkSystem: Infrastructure and interface to geometry and persistency



Construction sites

Working generic tracking package

- MarlinTrk is the first proof-of-concept prototype
- Interfaced to GEAR and KalTest

Geometry interfacing

- GEAR doesn't fulfill requirements
- dd4hep is successor

Tracking in a nutshell

1. Algorithm and its steering
2. Geometry relations: track parameter propagation and material effects

We have (1) but (2) is not really complete nor compatible

Geometry related needs in a nutshell

To perform a track fit on a set of hits one needs the

1. amount of passive material (e.g. in X0) passed by a trajectory between two hits
2. exact point which is going to be hit on an active readout surface while following a trajectory
3. normal vector(s) on the measurement surface at the crossing point

- It's clear that not everything is in the hand of geometry
- It's also clear that this is tightly connected with geometry
- Need to good and well-defined interface!
- Two challenges:
  1. Solve the problem(s): design interface and algorithms
  2. Efficiency: accuracy vs. time consumption

In progress

Exchange the algorithmic side for easier connection with geometry

- Started working with GENFIT: generic tracking tool, used for Belle-2
- Very large overlap with goals of tracking WP
- Geometry is based/built with TGeo
- Clear connection to dd4hep

GENFIT in 5 s

- Algorithmic content: validated Kalman, DAF, General Broken Lines
- Track propagation with different tools, including GEANE
- Runs with full simulation geometry in micro stepping mode
- Major revision in progress

Current questions

Learning TGeo

- Frank created a very helpful example of the inner detectors of ILD
- Read out the hierarchy of information

TGeo functionality

- TGeoNavigator propagation only straight lines
  extend to helices
- Intelligent stepping: calculation of safe distance
- Stepping to next boundary with proper propagation (still unclear)
- Calculating crossing points and normal vectors