Status of CAFs for SAND

Matteo Vicenzi, Lea Di Noto

Meeting Annuale della Collaborazione Nazionale DUNE

Laboratori Nazionali di Frascati

November 7th, 2022

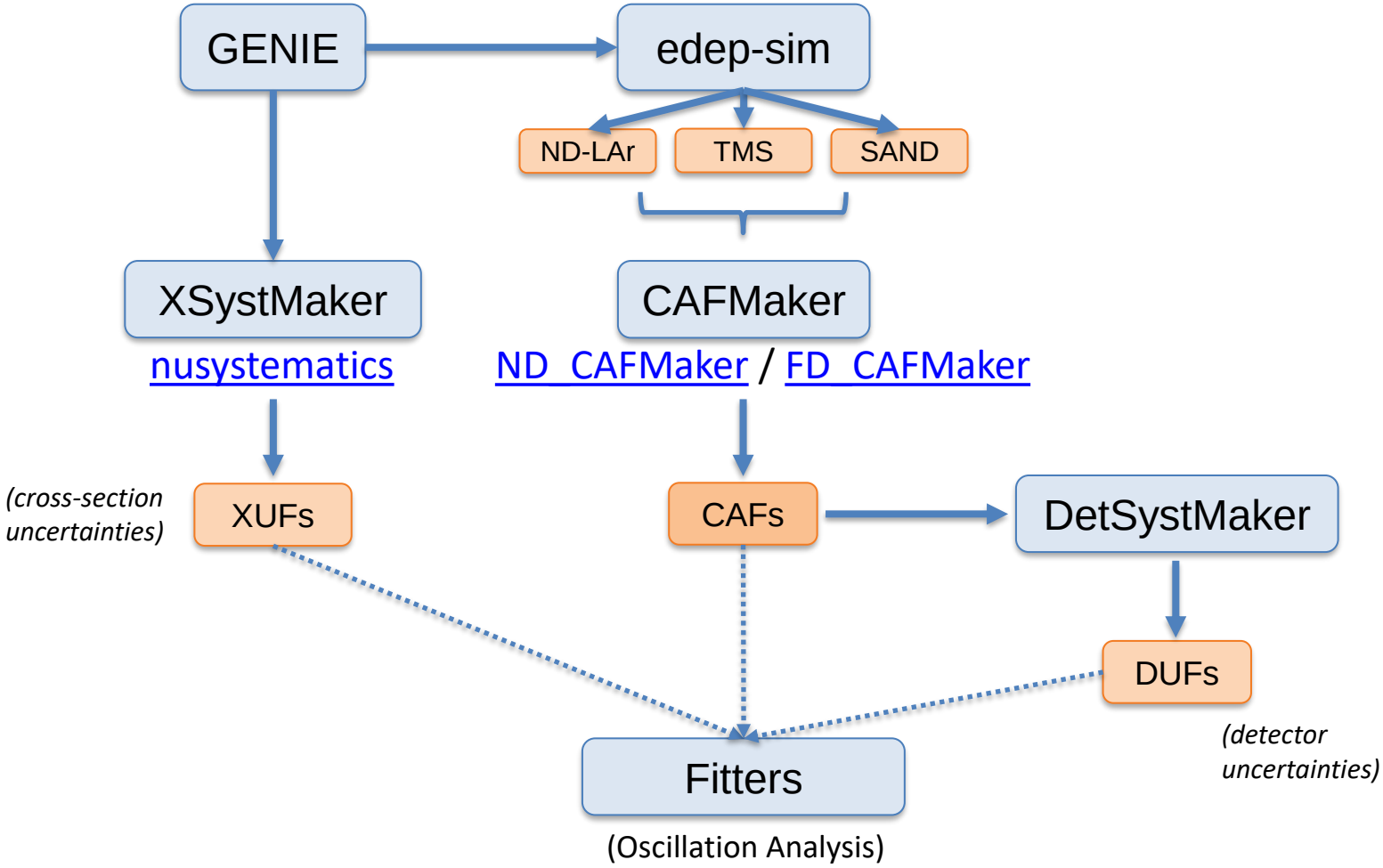
CAFs

- **CAF**s: **C**ommon **A**nalysis **F**iles.
  - Analysis-level format for reconstructed samples.
  - Input for **oscillation analysis.**
- **CAFAna**: analysis framework for CAFs.
  - Used for DUNE TDR & related papers.

- DUNE is moving towards **Mach3** (MCMC fitter) for the next analysis → but CAFs will remain the **standard input** for event samples.
- All ND inputs, including those from SAND, will be required in CAF format.

Infrastructure*

*as preliminarly defined at CERN workshop in August



SAND status

- ND_CAFMaker: https://github.com/DUNE/ND_CAFMaker
- As of August, **SAND is officially integrated** → now same code can produce CAFs for all ND components.
- CAF contains a StandardRecord object that defines the data structure (both truth and reco).
  - Truth variables: common to ND, already defined.
  - Reco variables: few common to all (E_ν^{reco}, E_{lep}^{reco},…) + detector-specific ones.
- Restructuring ongoing: need to make our own SAND sub-structure (in SRNDBranch)

What's next?

- We need to define **SAND high-level reco variables**.

- Need to be sufficient for:
  - applying selection cuts
  - compute the variables needed for binning (e.g: y_{rec} in the last oscillation analysis)
  - compute detector systematics

→ **SAND internal discussion needed**

Summary

- SAND CAF integration in ND_CAFMaker completed.
- Need to define its contents, reconstructed variables for SAND analysis (for oscillations & beyond).

THANK YOU!