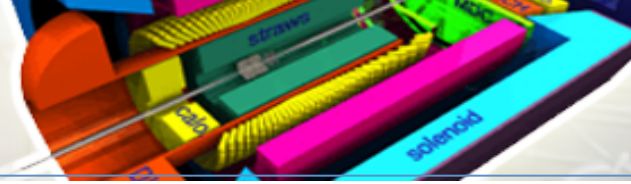

Simulations for the PANDA initial setup

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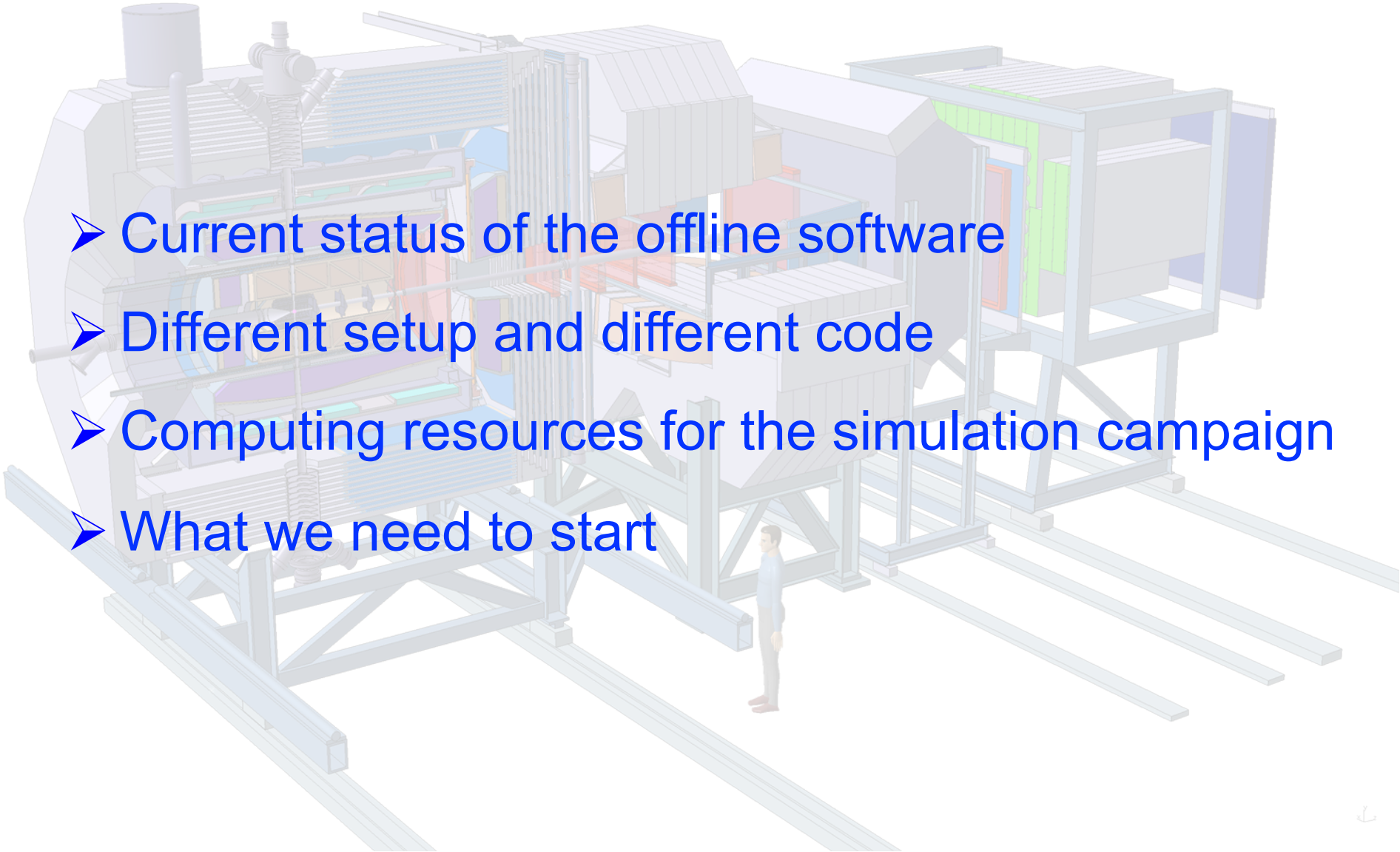


- Current status of the offline software
- Different setup and different code
- Computing resources for the simulation campaign
- What we need to start

Status of the Offline Software

Barrel Spectrometer

- ✓ Full realistic tracking
- ✓ Particle Identification for all the detectors
- ✓ Cherenkov Detectors with fast simulation

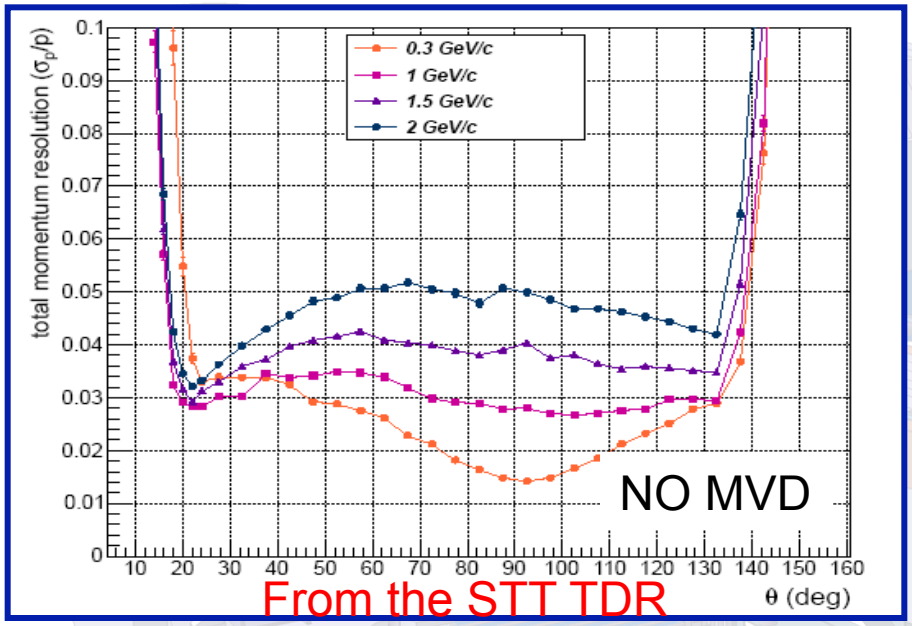
Forward Spectrometer

- ✓ Ideal Tracking (real coming soon)
- ✓ Particle Identification not standardized (only user selections)
- ✓ Work needed for several topics (side ftof, overlaps, pid…)

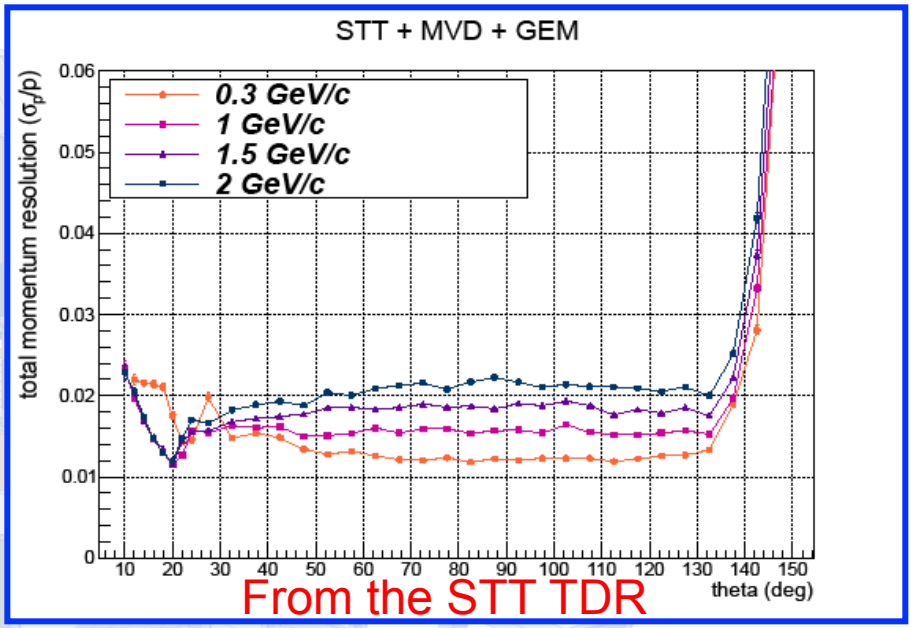
	A	B	C	D	FULL
TARGET	CLUSTER	CLUSTER	CLUSTER	CLUSTER	CLUSTER
MVD			strip		
STT					
GEM					
BAREMC			6/16		
FWDEMC					
BKWEMC					
DIRC	or DISK	or DISK	or DISK		
DISK	or DIRC	or DIRC	or DIRC		
SCITIL					
MDT					
FTS	1-2		1-2		
FTOF	reduced		reduced		
SHASHLICK					
FWD MDT					
LUMI					
LAMBDA					

One of the many proposals I have seen

MVD, no MVD, partial MVD



From the STT TDR



From the STT TDR

2 x Momentum Resolution w/o MVD
(and of course no vertexing)

Partial MVD ➔ we need new CAD conversion

EMC, no EMC, partial EMC

No EMC barrel

- ✓ no channels with neutrals in most of the phase space
- ✓ no electron identification
- ✓ a bit less stopped pions for MDT (20 cm of lead...)
- ✓ more curling particles for the central tracker

Partial EMC barrel ➔ we need an updated EMC geometry

maybe several EMC geometries

EMC offline software needs active manpower to check calibration, error matrices, background suppression

SciTil or not SciTil

That is the Question (W. Shakespeare)

Who will provide the reaction time to the tracking?

- SciTil -> ~ 100 ps
- MVD -> few ns
- EMC -> few ns
- STT -> several ns

No time to develop a STT stand-alone t0 reconstruction algorithm

We can add a time smearing in the isochrones calculation of STT and check the tracking performances we can achieve

Going forward

In case of different FTS setup

we need the new geometry files

In case of different DIPOLE

we need new maps at different beam momenta

and new geometry files

In all the cases, we will use ideal tracking and user selections for eventual particle identification

Analysis Tools

Reconstruction of charged channels
used successfully in many analyses

Vertex Fitters well validated, Kinematic Fitters could be improved

Reconstruction of neutral channels
shows still large background and not stable fitters

due to extremely limited manpower on EMC offline software

Fast Simulation

- MCTrack can be used for rough acceptance studies adding a momentum smearing, to exclude channels
- The Fast Simulation framework is existing but not updated since a long time
- Each setup could require different momentum parametrization, different response… time consuming
- I believe we need to run full reconstruction for our chosen channels

	Size	CPU Time
Simul.	36 kB/evt	1.7 sec/evt
Digit.	14 kB/evt	0.4 sec/evt
Reco.	10 kB/evt	0.8 sec/evt
PID	3 kB/evt	0.5 sec/evt
Total	~ 63 kB/evt	~ 3.4 sec/evt

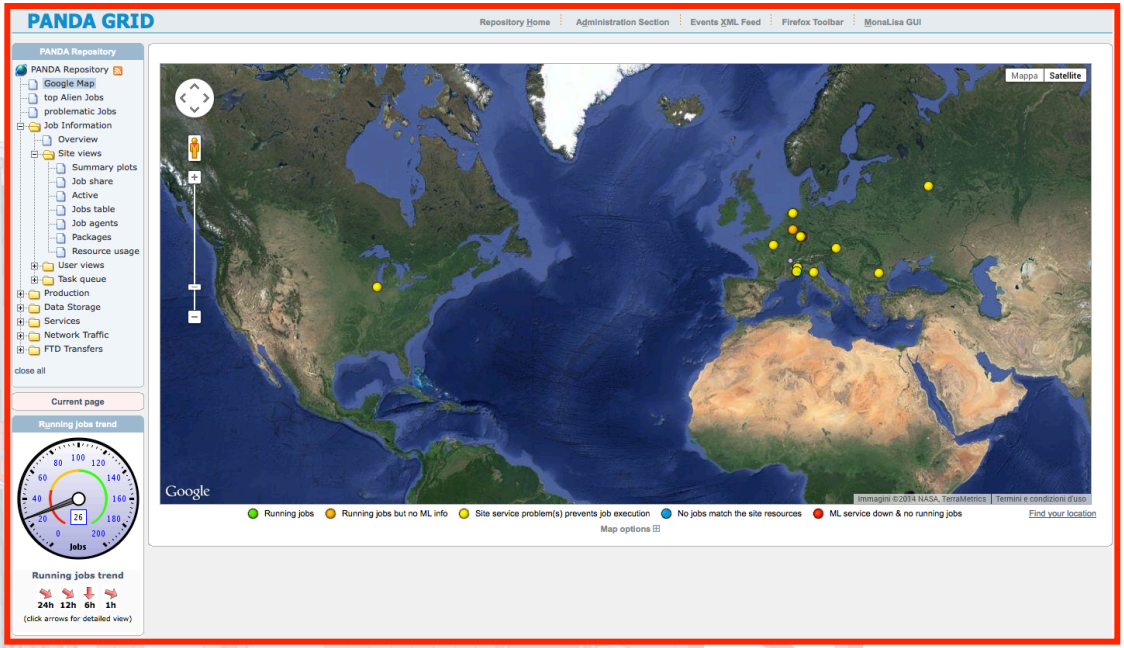
DPM @ 4 GeV/c

Half of the computing time goes to simulation

Computing Resources

PandaGrid

Slower to start
(authentication, jdl…)
but good managing tools
(MonaLisa, resubmission)



Prometheus farm @ GSI

10k cores for all the GSI/FAIR experiments
(PANDA, CBM, HADES, ALICE, theory…)

How much storage?

We need to negotiate to have fixed job slots

I believe we will need both the systems

What we need to start

- An approved definition of the detector setup to investigate

  This will require the creation of detector geometry files (responsibility of the detector groups) and most probably small changes in the reconstruction code

- A list of benchmark channels to explore

  First trying with fast simulation, then focusing only on the more promising channels

- A list of people willing to do analysis!