

# ILD Alignment task force

1. meeting of the ILD alignment task force group on Thursday, 14/5/2009

Some background:

IDAG has reviewed ILD and has come back with a number of questions

High importance: alignment and calibration

Answers to these questions have to be available by June 12!

Definition: alignment is the determination of the geometry of the detector

Alignment does not include calibration

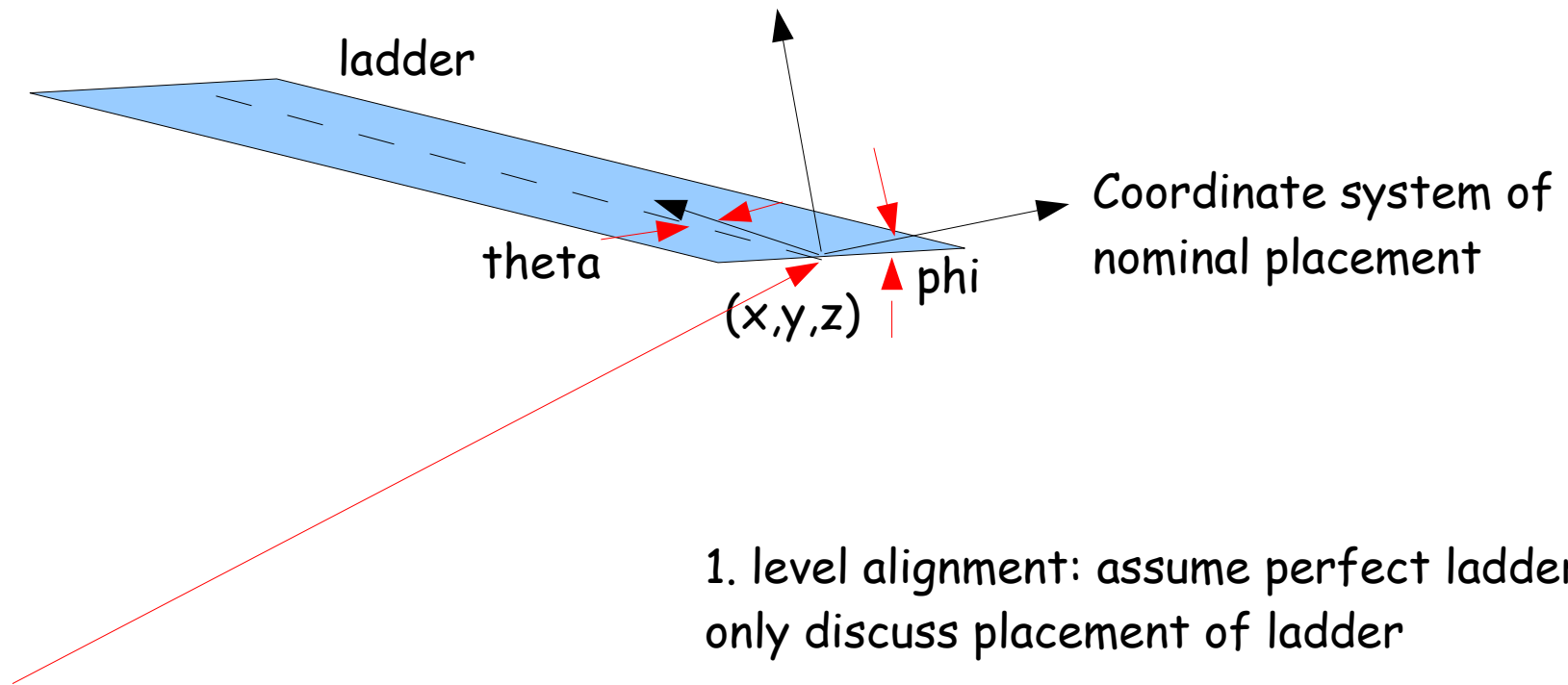
## Common questions (2): alignment

What is your plan for aligning your tracking systems. What is the precision required?

Are there special operations needed for alignment after push-pull prior to data taking, and what time is required? How many degrees of freedom need to be considered after a move? How do the alignment needs affect the design of your detector? Is any real-time monitoring of the tracker alignment envisioned (e.g., related to power pulsing and long term stability)?

# Alignment type 1

Vertex detector: how do we know the placement of the ladders  
(position in 3D  $(x,y,z,\theta,\phi)$ )



# Alignment 1

Silicon tracking:

How do we know the position of the ladders and wheels

How do we know the relative position between different detector parts

How many degrees of freedom and how much time dependence do we have?

Are there conceptual differences inner - outer SI detectors?

TPC:

Assuming a calibrated TPC: how do we align the TPC with the rest of the detector?

# Alignment systems

Hardware:

- Permanently installed hardware to determine and monitor alignment
  - Laser alignment system
  - Other hardware?
- One time measurement (during installation? After push pull) to determine set of alignment constants

# Alignment Systems

Software based alignment systems:

- Event based detector alignment
  - Which type of events?
  - Achievable precision vs. time
  - Special running conditions needed?
  - Need for special algorithms and tools?

# Work Program

- Hardware:
  - Specify the hardware discussed and present possibilities and limitations
  - What work is ongoing within ILD in this respect?
  - Who is responsible for what?
- Software
  - Can we do a case study based on simulated data to demonstrate the alignment capabilities?

We should learn from the LHC experiments and their experience for aligning the Silicon based detectors.

# What to do

Try to define some tasks and assign names to tasks

Start today, continue - if necessary - by e-mail

Regular meetings (once a week) by phone until mid June

Prepare a short writeup by June 12 for IDAG