LENA: Issues to discuss

LENA Working Group Meeting
Zeuthen, 16 Nov 11

M. Wurm (UHH)

Items to be discussed

- Group infrastructure
- Representation to the outside world
- Material needed for LAGUNA-LBNO
- Studies on detector hardware
- Detector simulation
- HE event reconstruction
- Phenomenology studies

Group Infrastructure

- Regular meetings
- Mailing list(s)
- Wiki for documents
- Online repository for simulation code

Representation to the outside

- Public LENA website
- Finalization of the white paper
- Letter of Intent
- Definiton of topical working groups/organizers
- Spokespersons
- Naming: „LENA“? „LAGUNA-LSc option“?

Resubmission of the white paper

- WP has been restructured
- new section on detector performance
- still missing: small items on
  - proton decay (MW)
  - electronics (CC)
  - beam physics (AS)
- revived discussion on geoneutrinos
- should we increase volume of the abstract?
- new and final deadline: Nov 30

Material needed for LAGUNA-LBNO

- Tank parameters for Technical Board (Nov)
- Plan for incremental approach (cavern sizes, detector sizes)
- Comprehensive documentation on construction and operation of LENA
- Input from Borexino
- Do we want input from KamLAND/SNO+?

Representation within LAGUNA

- Candidate for Chair of Technical Board
- Candidate for Chair of Institutional Board
- Contact persons/organizers for specific fields:
  + Technical aspects
  + Physics: Phenomonology, MC
  + ...
  and maybe sub-tasks

Hardware: Scintillator

- Proton quenching in LAB (TUM)
- Alpha quenching in LAB (SNO+)
- Wavelength-resolved scattering length for LAB (TUM)
- Exact absolute light yield for MC
- Study of LAB samples from Helm AG (TUM)
- Study of LAB from Kirishi Oil in St. Petersburg

Hardware: Photosensors

- Parameters for Hamamatsu 12‘‘ PMTs
- MC simulations for effective pe yield
- Normalization to Borexino coverage by MC
- Alternative sensors (?)

Hardware: Electronics

- Go beyond definition of basic requirements
- Collaboration with APC for PMm2 option
- Investigation of outside-FADC option

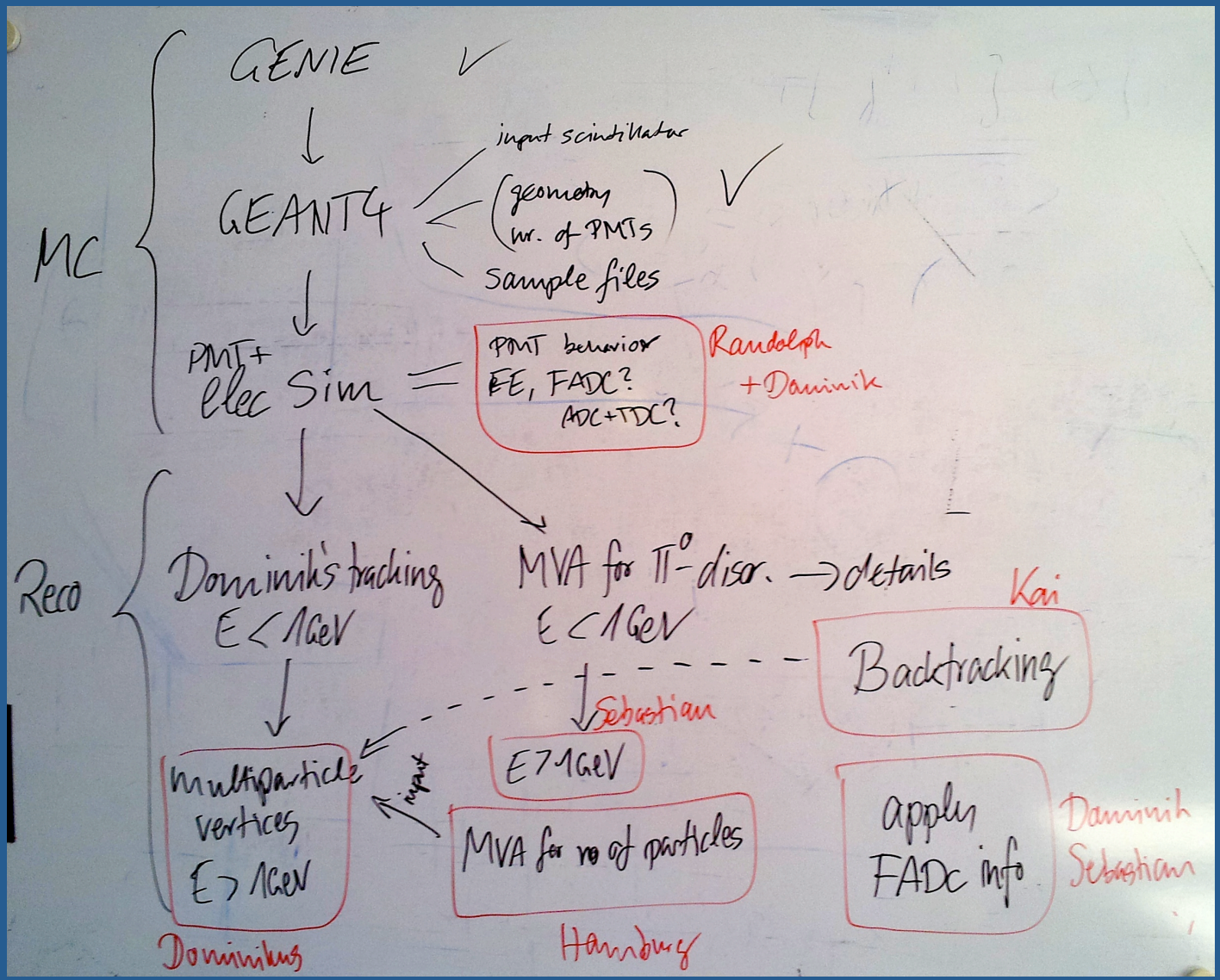
Hardware: Other components

- Water veto
- Top veto
- Nylon vessel
- Detector calibration (white paper?)

Monte Carlo

- Online repository
- Maintenance of clear documentation
- Define missing hardware input parameters
- Studies of detector performance
- Integration of all reco codes
- Standard event output for low-E studies: event energy, vertex position, start time, tof-corrected pulse shape

Yesterday Premeeting



HE event reconstruction

- Reco for multi-GeV energies
- Reco of multi-particle vertices
- Discrimination of beam backgrounds

Phenomenology: SN/DSNB

- Discrimination of different neutrino flavors
- Output for oscillation physics:
  what can we learn beyond θ_{13}? (A. Mirizzi)
- Output for core-collapse physics:
  contact to T. Janka?
- NC atm. background for DSNB → paper

Phenomenology: Geo/reactor-ν

- Systematic uncertainties on U/Th analysis
- Influence of new reactor close to Pyhäsalmi
- Oscillation physics for reactor ν's:
  Precision measurement of solar Δm^2

Phenomenology: Oscillometry

- Neutrino sources:
  - background from Borexino
- Antineutrino sources:
  - low intensity sources
  - longer baselines for L_{13}-θ_{13}-search?

Phenomenology: Pion DAR Beams

- With θ_{13} large and known: focus on δ_{CP} search
- Event rates
- Discrimination of detection channels
- Background from atmospherics NC
- Contact to DAEdALUS
- Find out price tag

Phenomenology: Super-Beams

- Sensitivity to standard 4GeV Pyhäsalmi beam
- Bimagic baseline:
  is 1-2 GeV beam energy sufficient?
- ESS as a beam source:
  what can we learn for this L/E?

Phenomenology: Atmospherics

- Output on oscillation parameters
- Very-low or Very-high energy atmospherics

Phenomenology: Proton decay

- Background from atm. NC kaon production
- Sensitivity to alternative channels:
  $\pi^0 e^+$, but more importantly other kaon modes
- Neutron-antineutron-oscillations