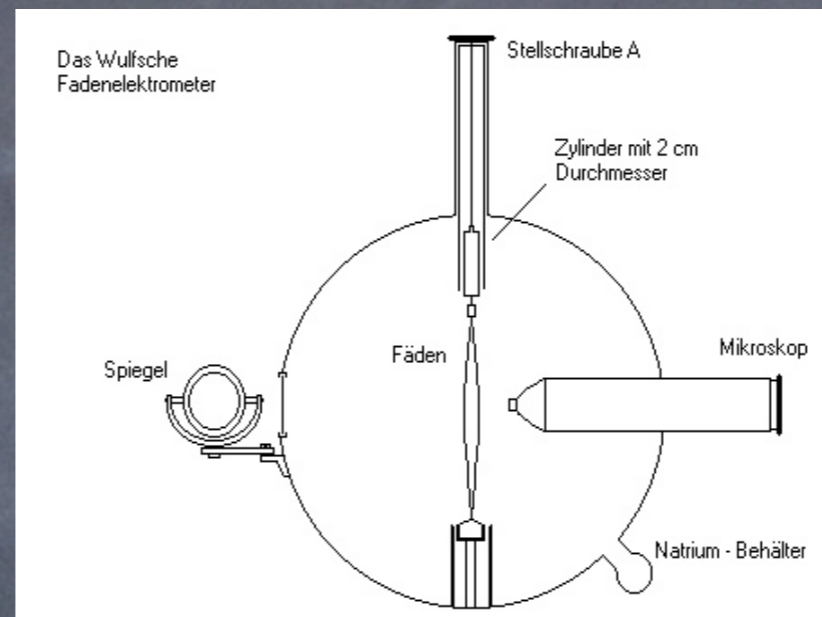
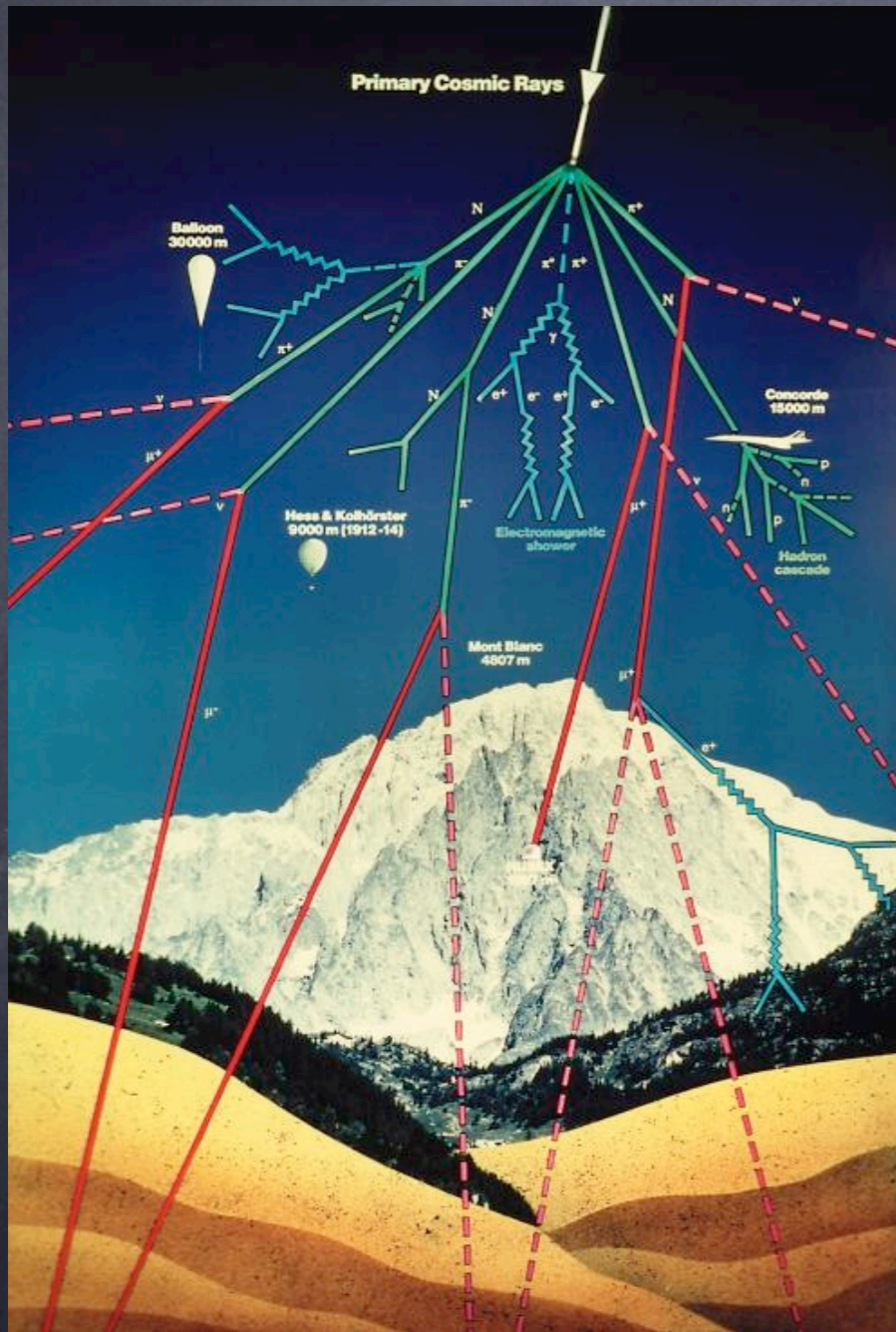




High
School
Project on
Astroparticle
Research with
Cosmics

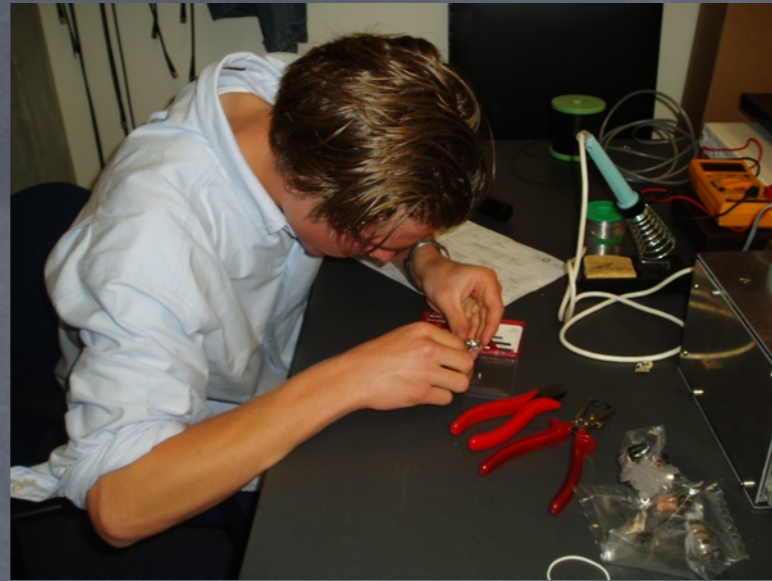
Discovery



Instrumentation

Adventure





Construction



and installation

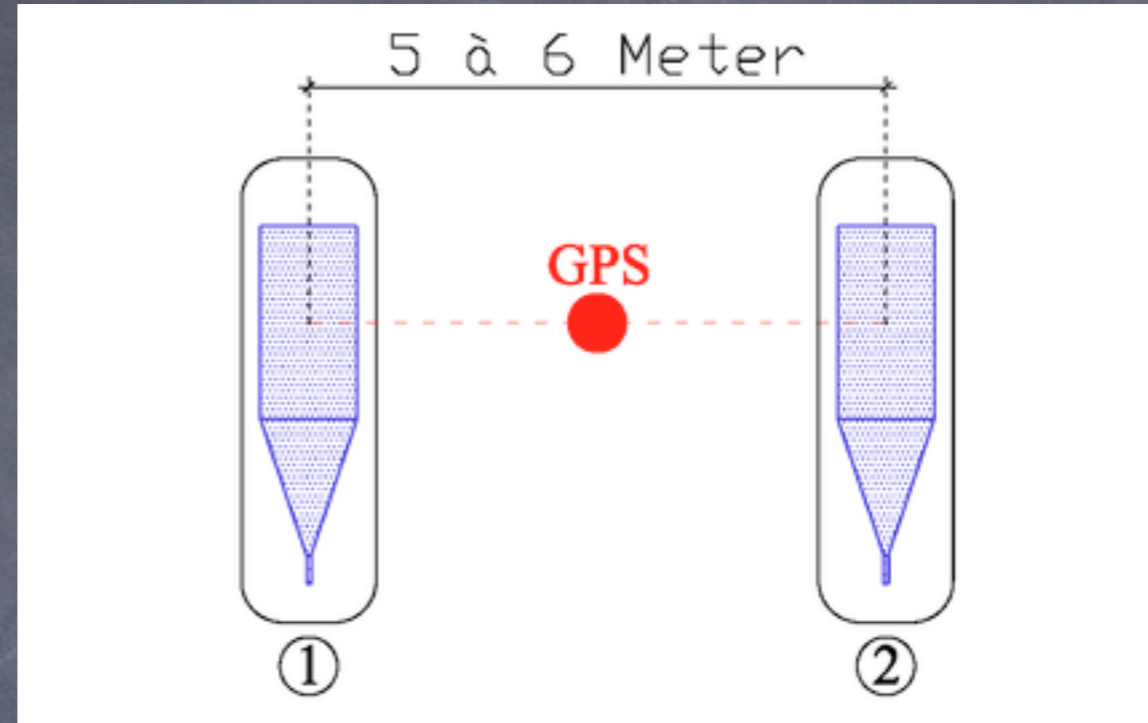


GPS

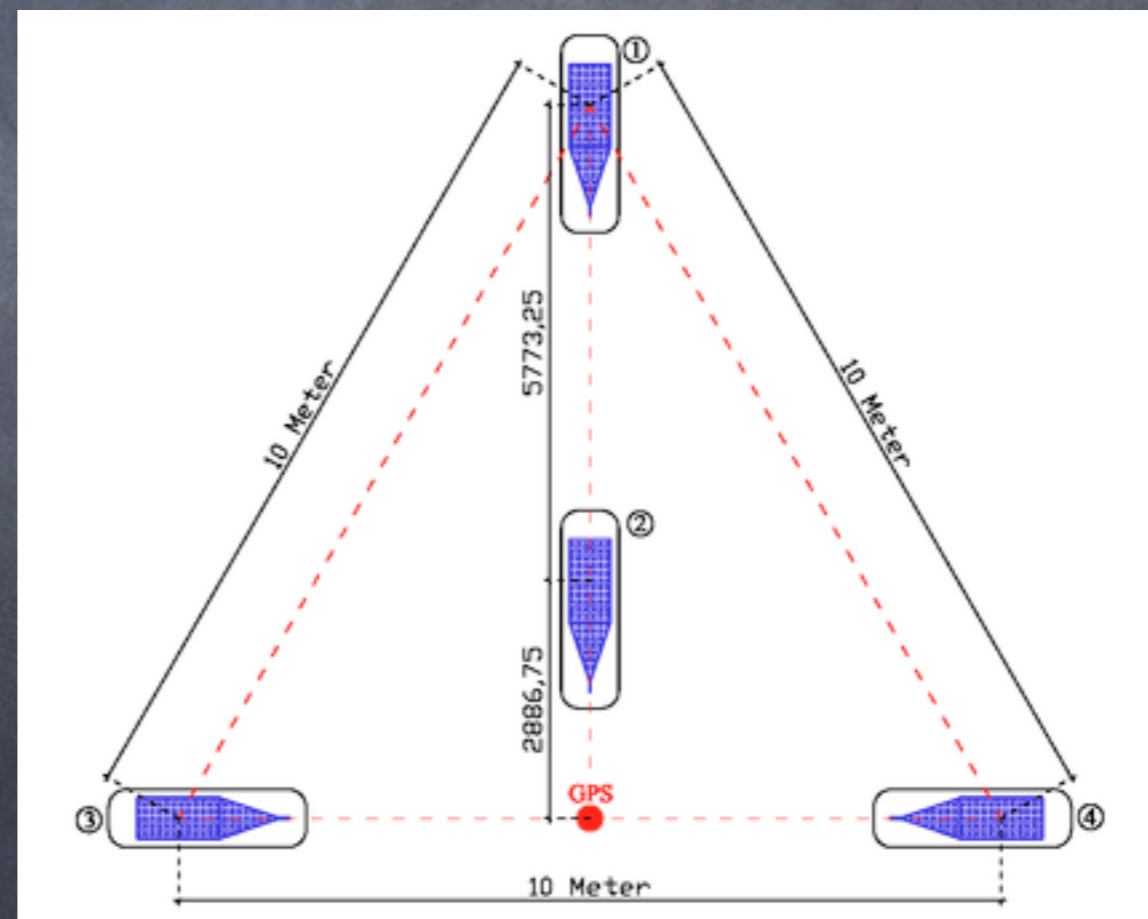


Detector station configurations

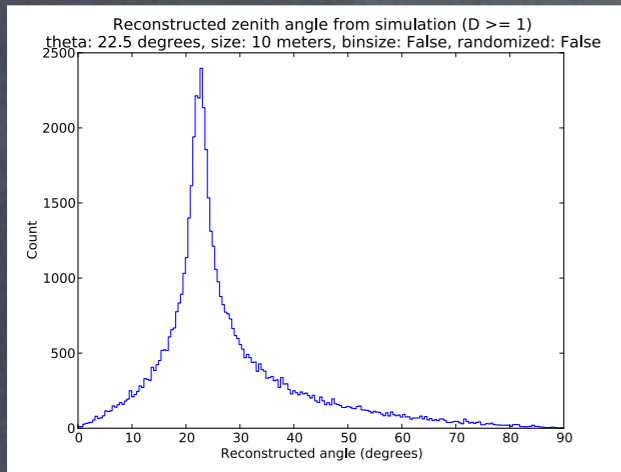
Standard 2-plate configuration



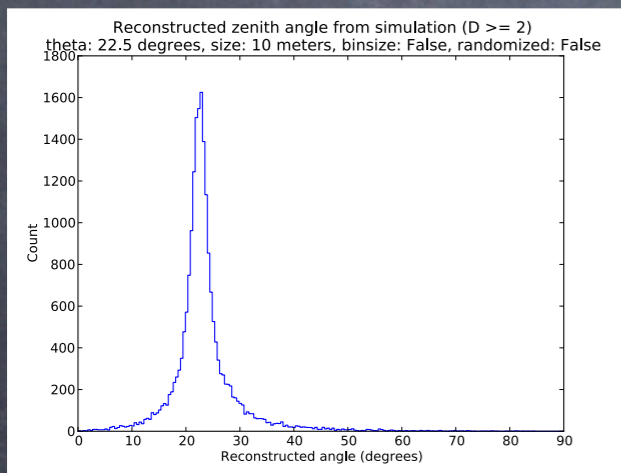
4-plate configuration with directional sensitivity



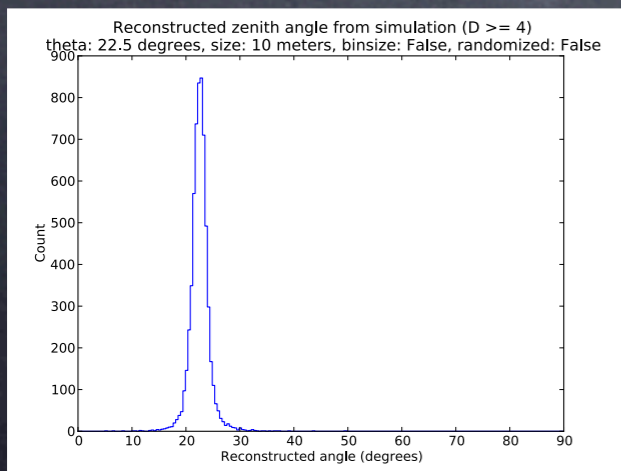
Zenith angle reconstruction for $\theta = 22.5^\circ$



≥ 1 particle/plate

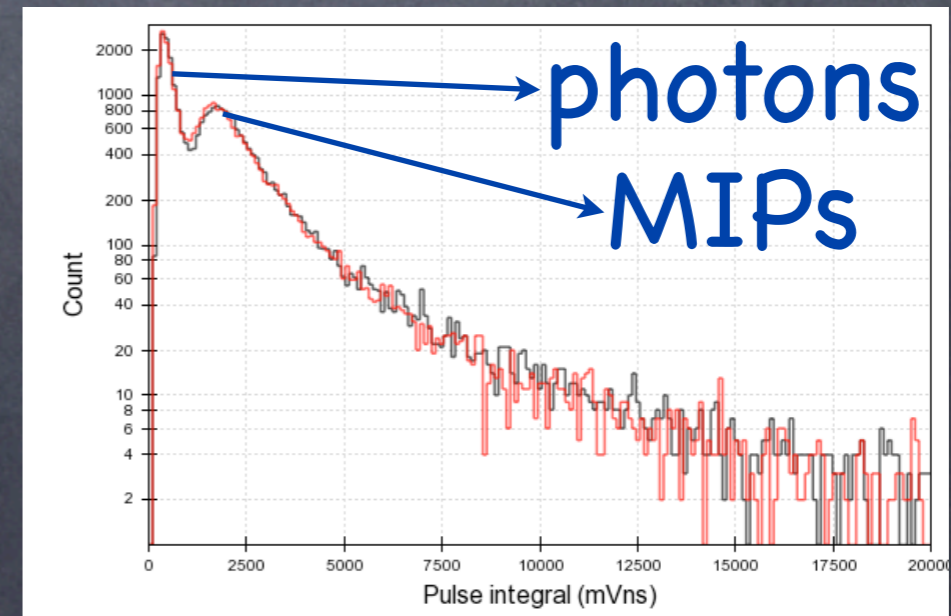
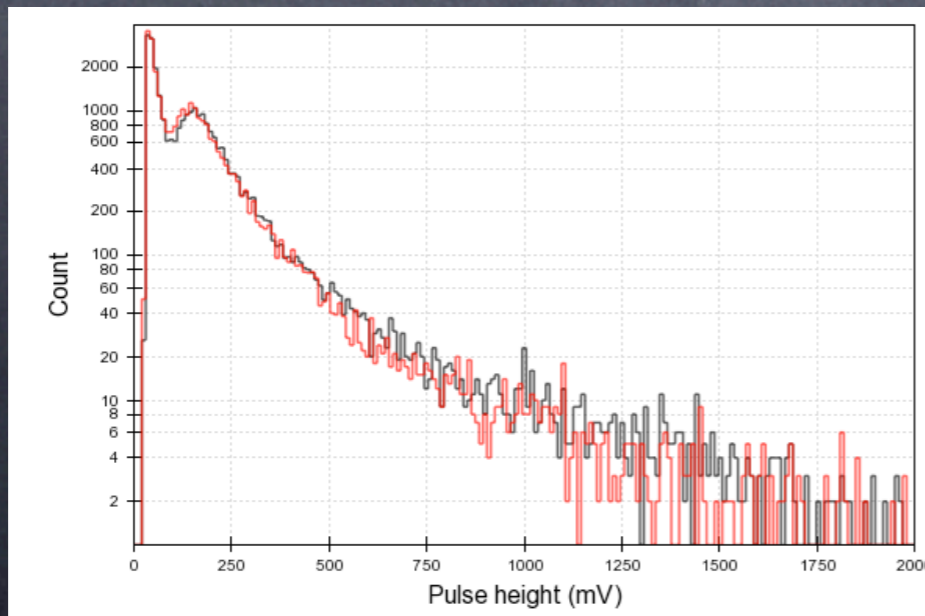
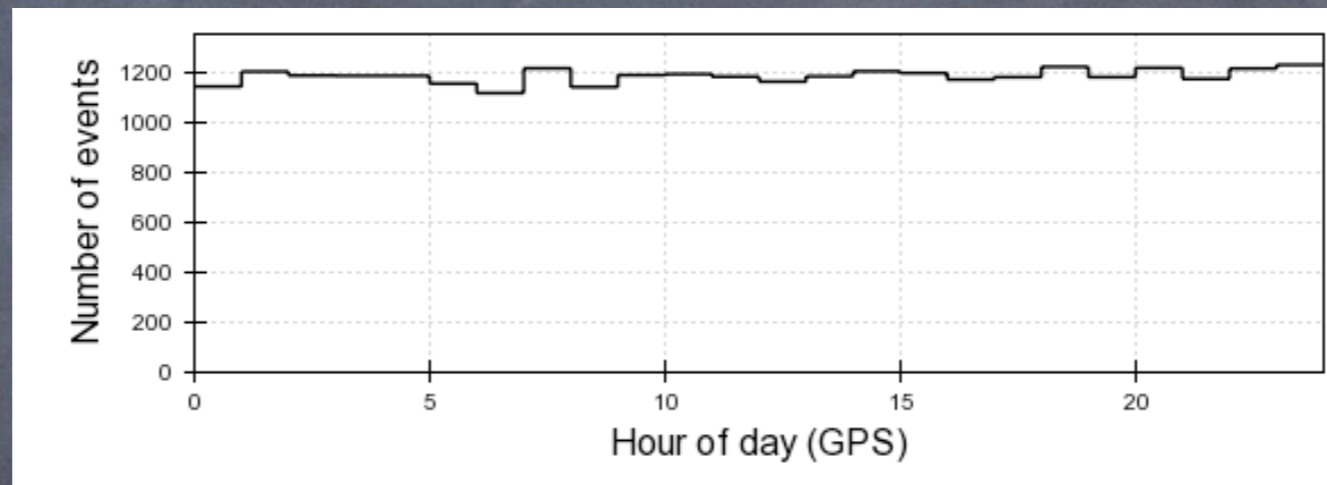
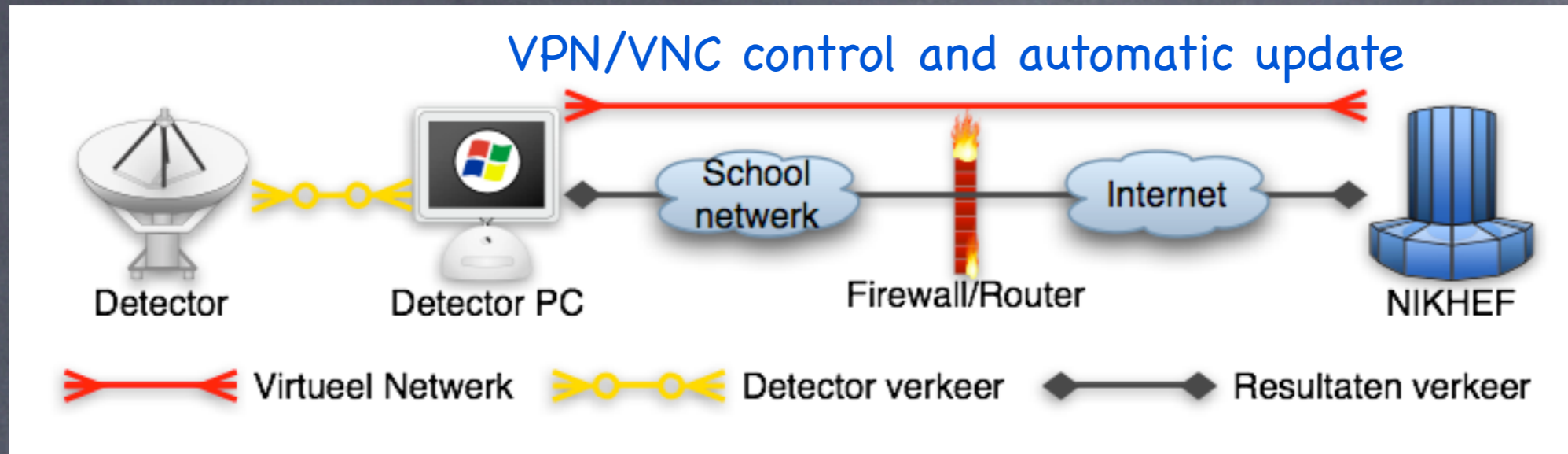


≥ 2 particles/plate



≥ 4 particles/plate

Data acquisition and storage




Communication via HiSPARC website




HiSPARC Over HiSPARC Docent & Student HiSPARC Data **Nieuws** Downloads NL | EN

HiSPARC nieuws
HiSPARC in de media
Nieuwsbrief
Links


HiSPARC Nieuws

7 mei 2010: Leerlingen Coornhert Lyceum naar CERN

Op 14 juni gaan Matthijs Kuik en Jacek Smit (de winnaars van het Leerlingsymposium 2010) een dag op bezoek bij CERN. Het Haarlems Dagblad wijdde hier op 28 mei een artikel aan. [meer >](#)


25 mei 2010: Storing Nagios
Helaas heeft gedurende het Pinksterweekend ons monitorsysteem (Nagios) stilgelegen. Dit heeft wellicht tot verwarring geleid door de mogelijke stortvloed aan waarschuwingsmailtjes. Alles... [meer >](#)


29 april 2010: HiSPARC Leerlingensymposium weer groot succes

Afgelopen woensdag (28 april 2010) werd op het University College Utrecht het jaarlijkse HiSPARC leerlingensymposium georganiseerd. Zoals ieder jaar begon het symposium met een lezing van een... [meer >](#)

26 april 2010: HiSPARC netwerk probleem
Afgelopen zondag in de vroege ochtend is er een probleem opgetreden op ons netwerk waardoor een groot deel van de pc's besloten heeft de benodigde VPN verbinding af te sluiten. Dit... [meer >](#)

28 april 2010: HiSPARC Leerlingensymposium met Vincent Icke

Op woensdag 28 april organiseert HiSPARC in samenwerking met het University College Utrecht het jaarlijkse Leerlingensymposium voor deelnemende scholen. Deze middag staat in het teken van kosmische... [meer >](#)

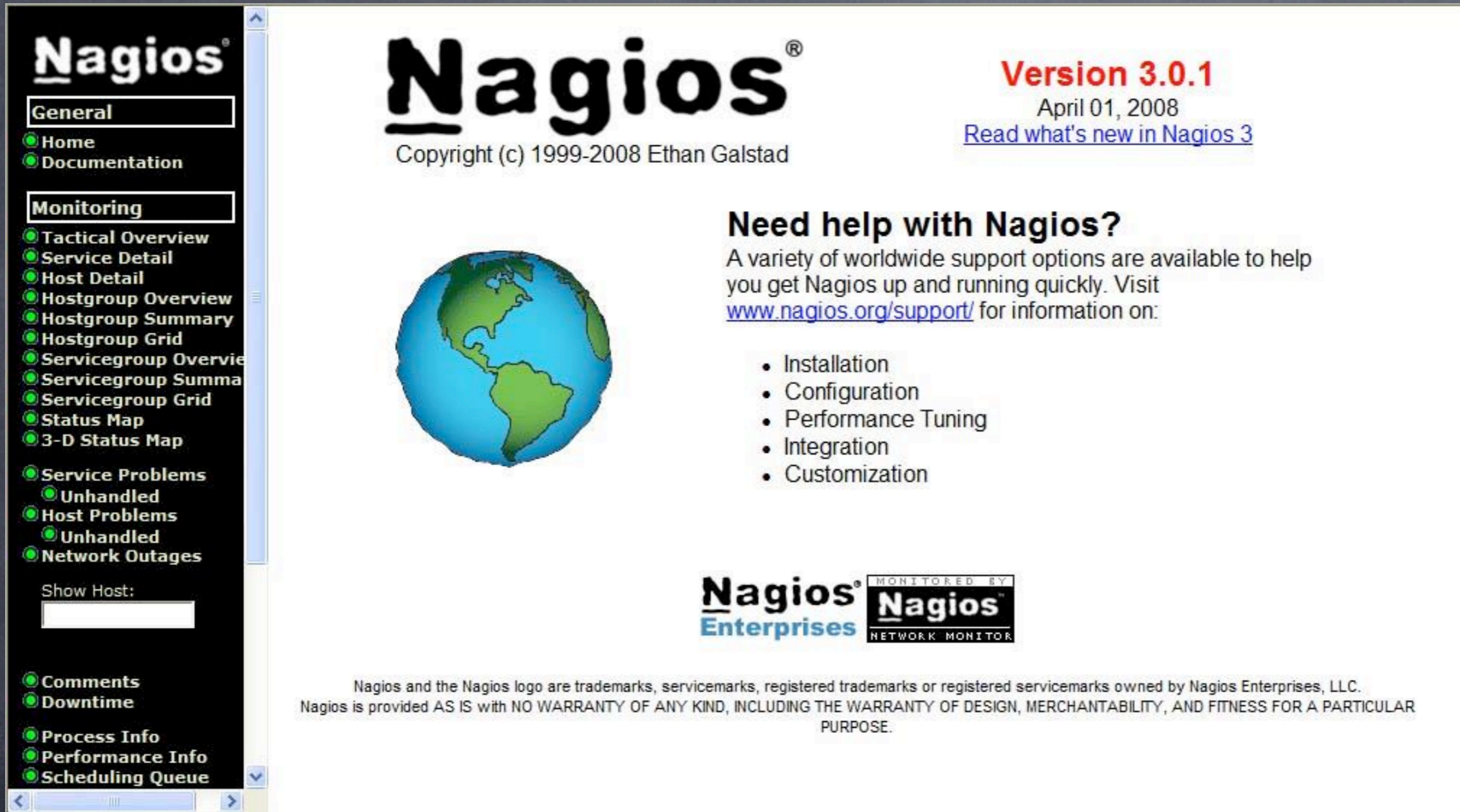
Overig Nieuws

30 september t/m 2 oktober: Cosmic Sensation in park Brakkenstein

Ruimtetraling live omgezet naar gesampelde dancemuziek. Uniek in de wereld: dansen op kosmische straling. Van donderdag 30 september tot en met zaterdag 2 oktober vindt in Park... [meer >](#)

Academische Jaarprijs uitgereikt aan Cosmic Sensation

Woensdagavond 7 oktober is de Academische Jaarprijs uitgereikt aan Team De Jong van Radboud Universiteit Nijmegen, een samenwerkingspartner van Nikhef. Team De Jong nam met zijn Cosmic Sensations de hoofdprijs van 100.000 euro... [meer >](#)

www.hisparc.nl

Network monitoring



Nagios
Version 3.0.1
April 01, 2008
[Read what's new in Nagios 3](#)

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Need help with Nagios?

A variety of worldwide support options are available to help you get Nagios up and running quickly. Visit www.nagios.org/support/ for information on:

- Installation
- Configuration
- Performance Tuning
- Integration
- Customization

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General

- Home
- Documentation

Monitoring

- Tactical Overview
- Service Detail
- Host Detail
- Hostgroup Overview
- Hostgroup Summary
- Hostgroup Grid
- Servicegroup Overview
- Servicegroup Summary
- Servicegroup Grid
- Status Map
- 3-D Status Map

Service Problems

- Unhandled

Host Problems

- Unhandled

Network Outages

Show Host:

Comments

- Downtime

Process Info

- Performance Info
- Scheduling Queue

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Current Network Status
Last Updated: Thu Apr 1 13:50:44 CEST 2010
Updated every 30 seconds
Nagios Core™ 3.2.0 - www.nagios.org
Logged in as nagiosadmin

Host Status Totals

Up	Down	Unreachable	Pending
0	0	0	0

Service Status Totals

OK	Warning	Unknown	Critical	Pending
10	0	0	0	0

Service Status Details For Host 'sciencepark501'

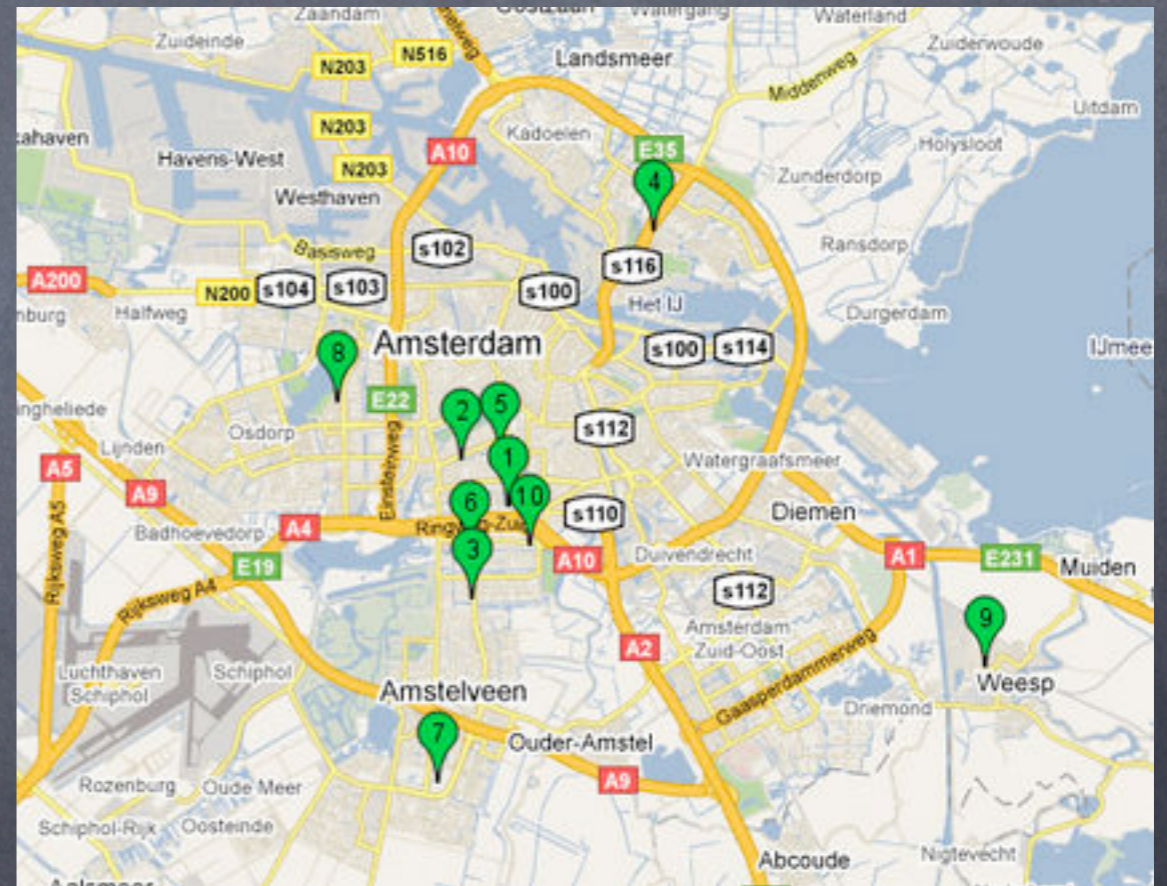
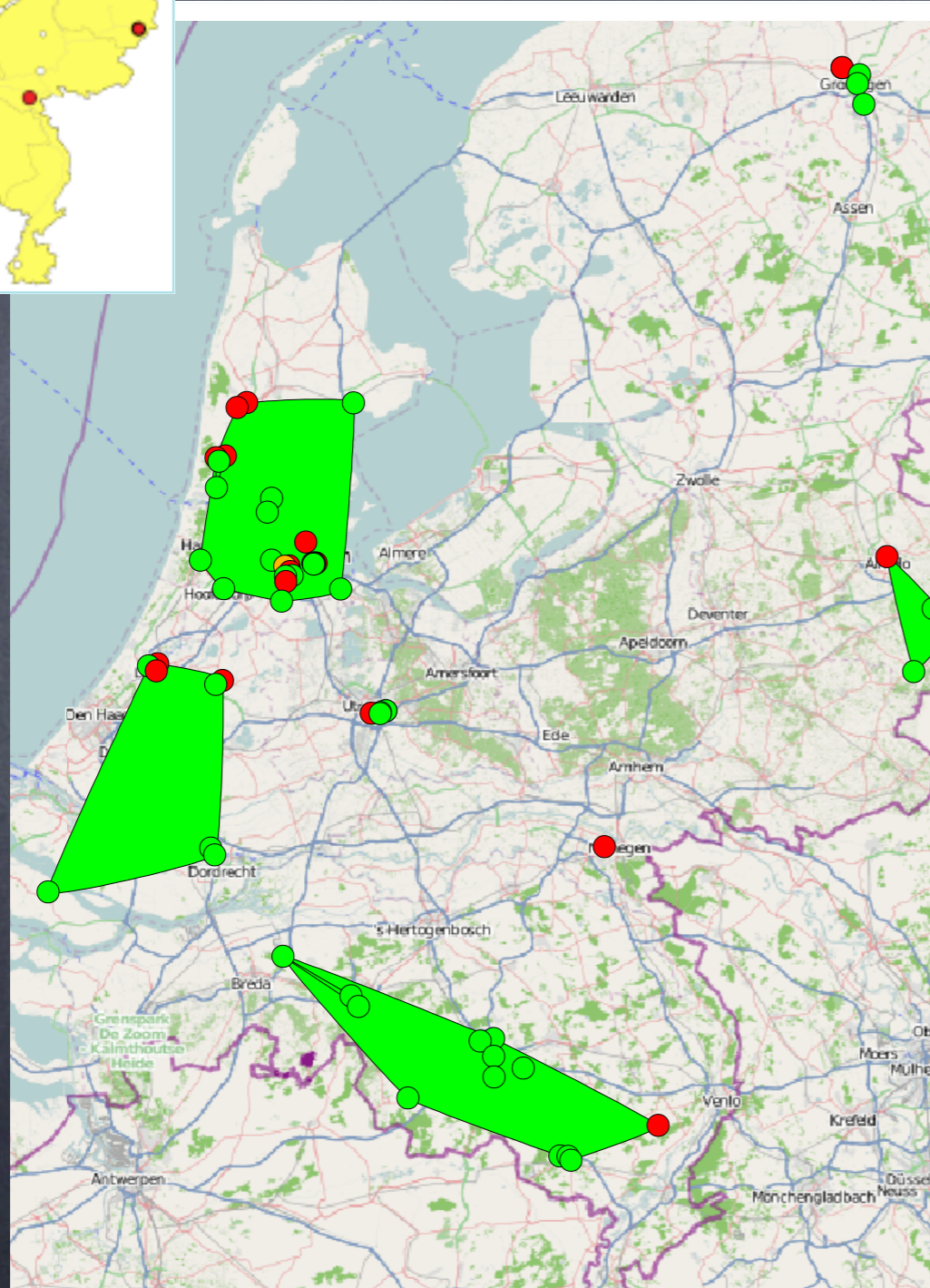
Host	Service	Status	Last Check	Duration	Attempt	Status Information
sciencepark501	Buffer Size	OK	04-01-2010 13:44:52	3d 4h 16m 42s	1/3	Buffer DB contains 5 events
sciencepark501	CPU Load	OK	04-01-2010 13:42:01	3d 4h 8m 43s	1/3	CPU Load 7% (5 min average)
sciencepark501	Drive Space C:	OK	04-01-2010 13:50:02	3d 23h 11m 31s	1/3	C: - total 40.00 Gb - used: 11.62 Gb (29%) - free 28.38 Gb (71%)
sciencepark501	EventRate	OK	04-01-2010 13:50:10	0d 10h 31m 9s	1/3	Event rate for a period of 61.28 seconds is 0.90
sciencepark501	Libraries/Cache	OK	04-01-2010 13:44:06	3d 4h 16m 40s	1/3	Memory usage: 54.0 Mb
sciencepark501	Memory Usage	OK	04-01-2010 13:43:50	3d 4h 8m 43s	1/3	Memory usage: total 2442.61 Mb - used: 441.04 Mb (18%) - free: 2001.56 Mb (82%)
sciencepark501	Storage Growth	OK	04-01-2010 13:50:11	24d 0h 37m 42s	1/3	Storage growth: -0.833333 Hz
sciencepark501	Storage Size	OK	04-01-2010 13:50:09	23d 23h 37m 44s	1/3	Storage size: 14 events
sciencepark501	TriggerRate	OK	04-01-2010 13:50:08	0d 10h 31m 11s	1/3	Trigger rate: 0.94 Last update: 8 seconds ago
sciencepark501	Uptime	OK	04-01-2010 13:43:01	3d 4h 17m 43s	1/3	System Uptime - 0 day(s) 10 hour(s) 27 minute(s)

10 Matching Service Entries Displayed

Network geography



Clusters

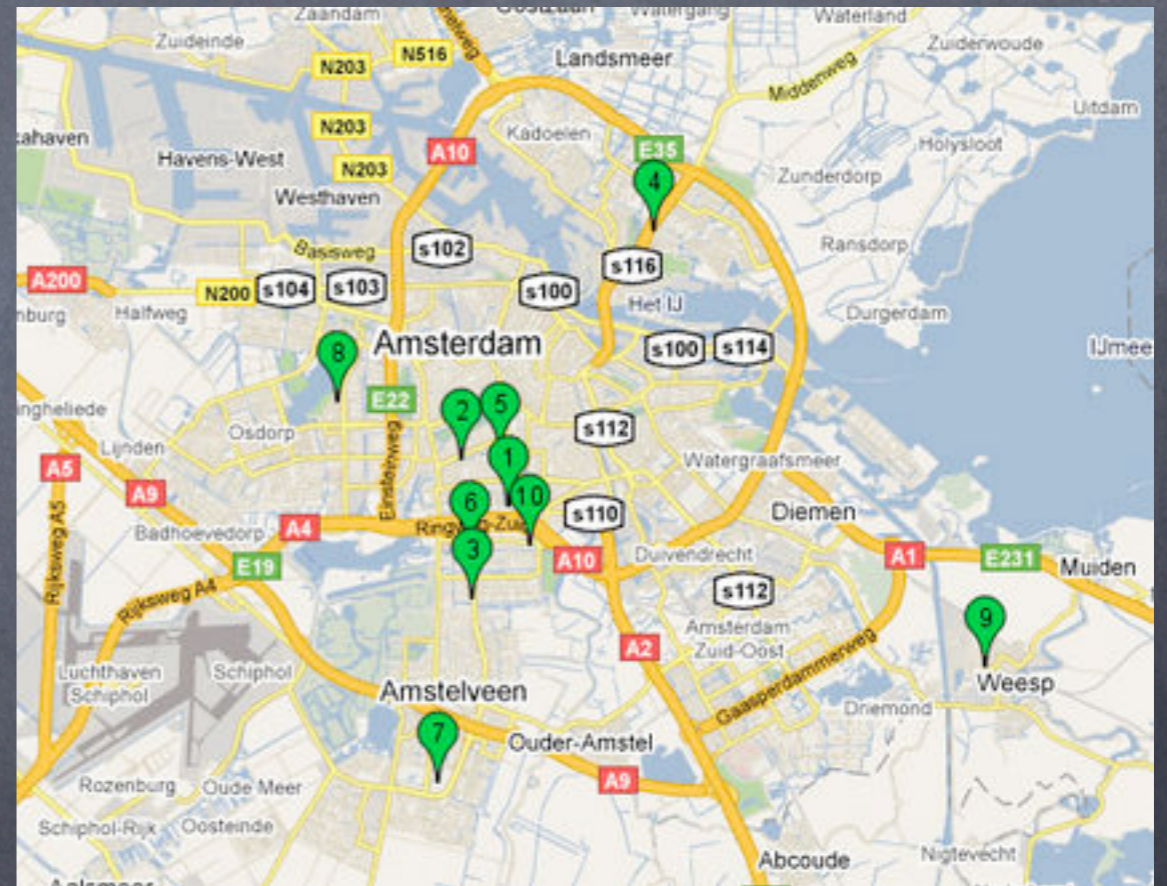
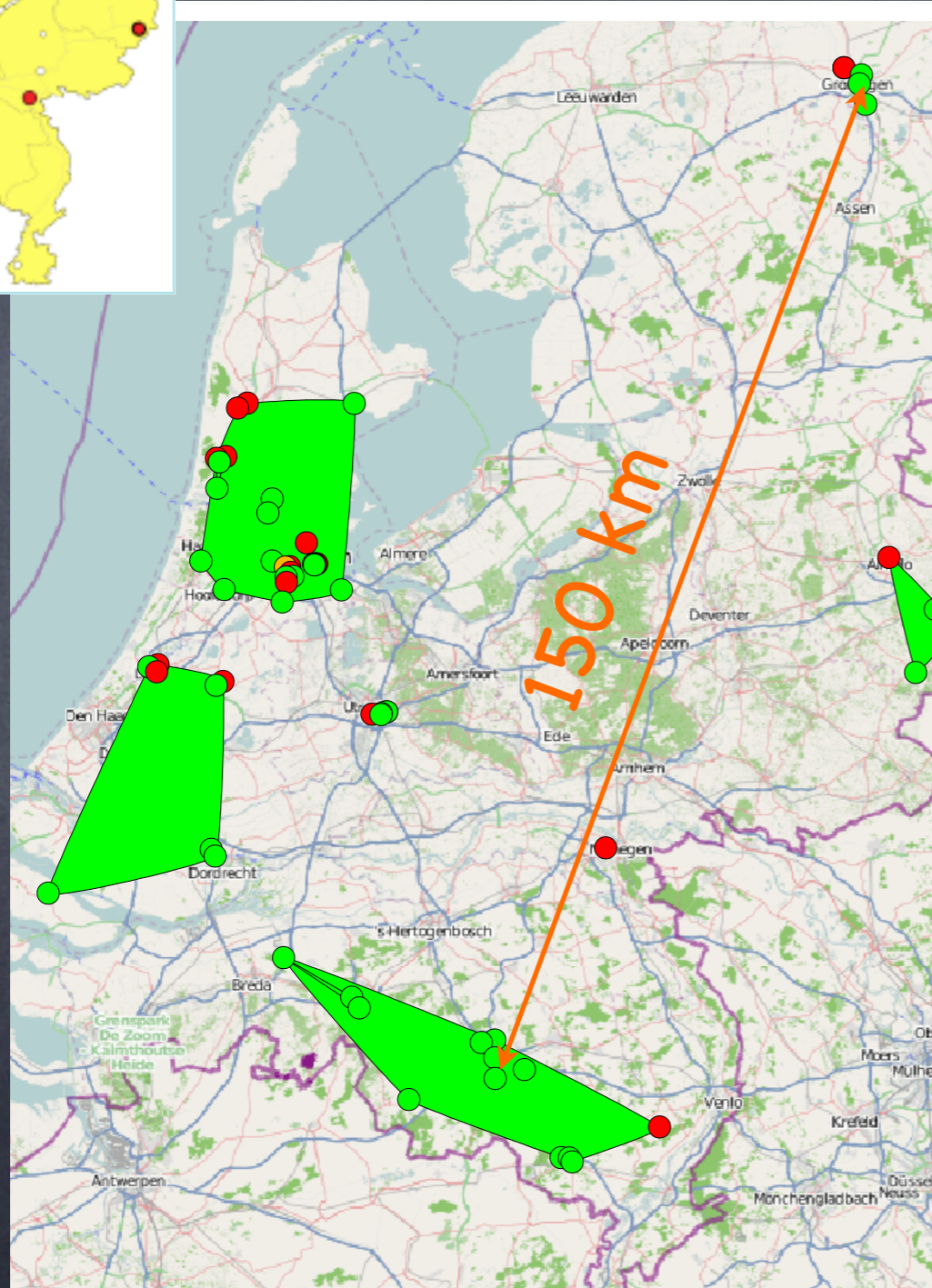


Subcluster Amsterdam

Network geography



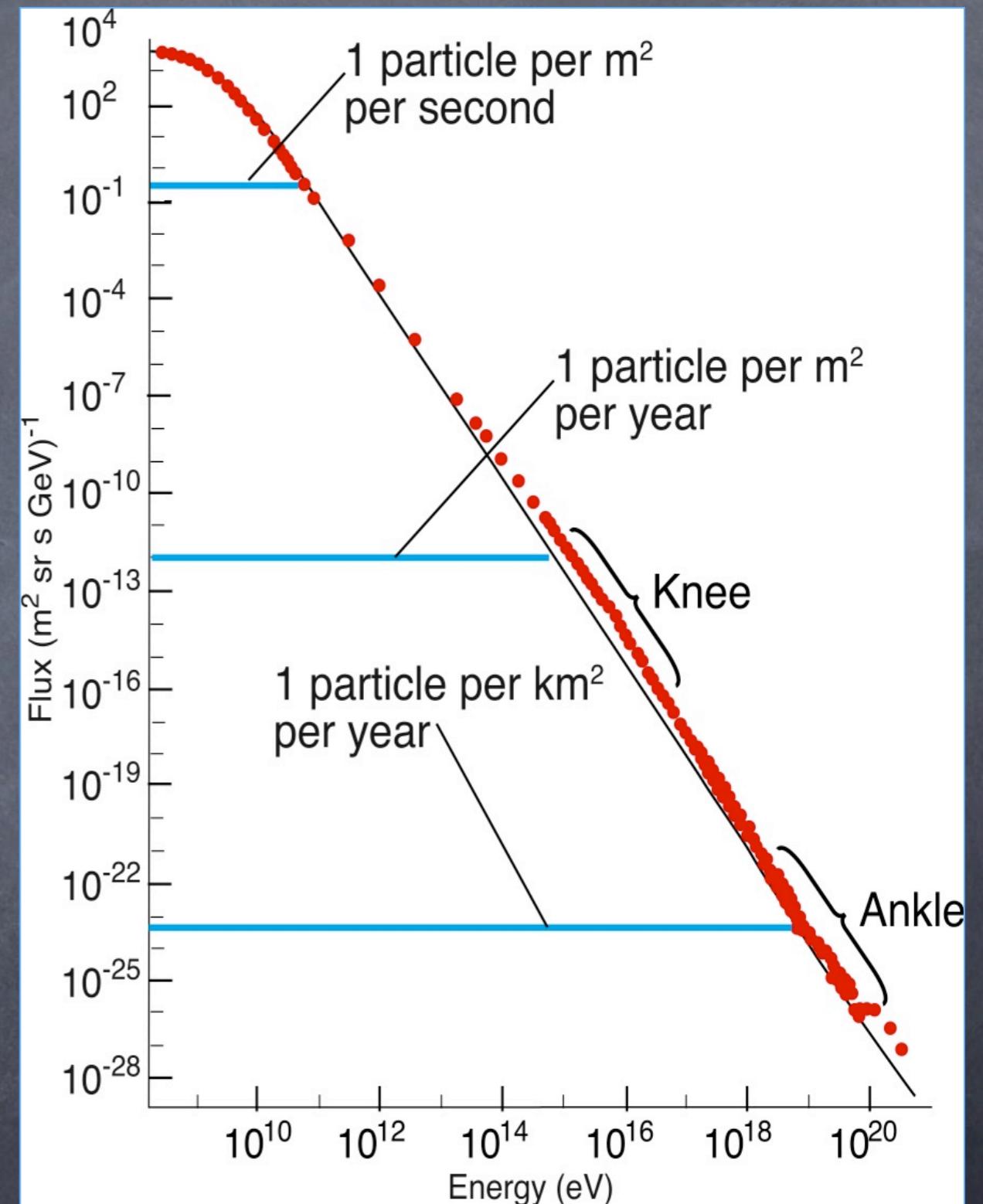
Clusters

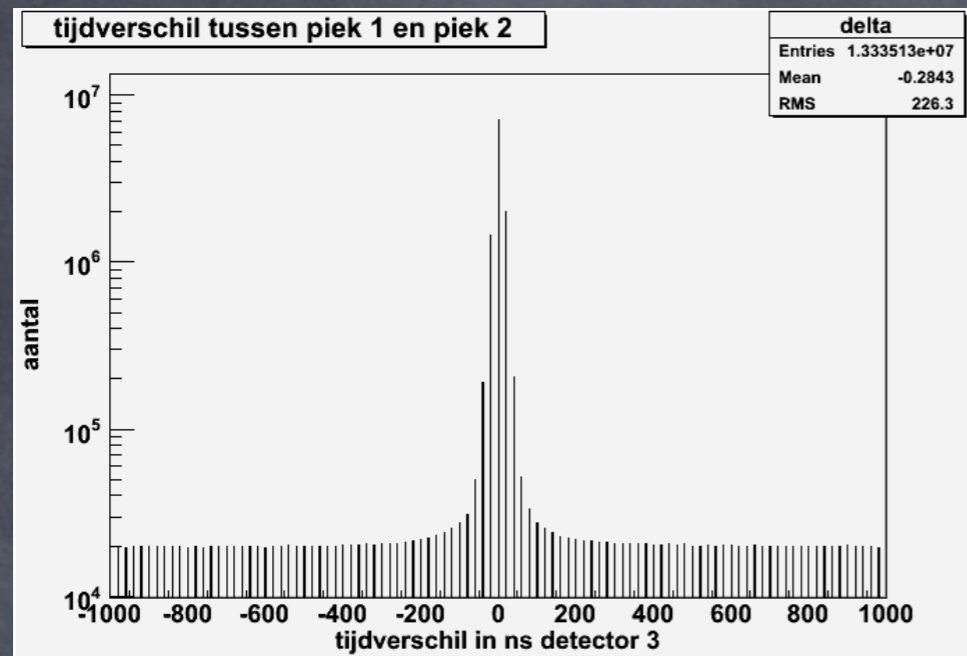


Subcluster Amsterdam

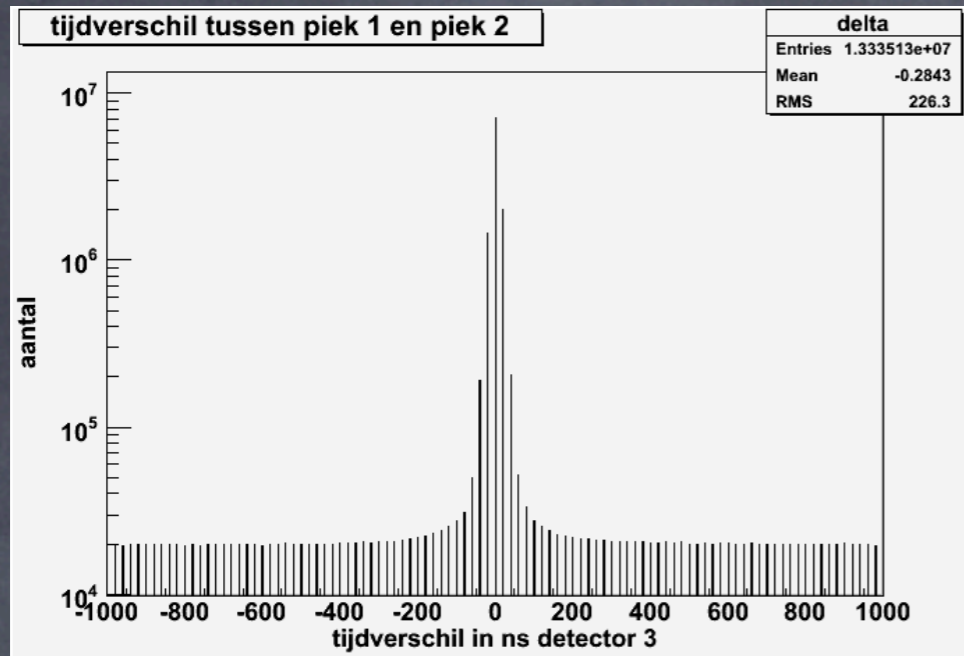
Typical distance in
clusters 500-1000 m

→ coincidences between
detector stations only
for showers of
 $E > 10^{15}$ eV

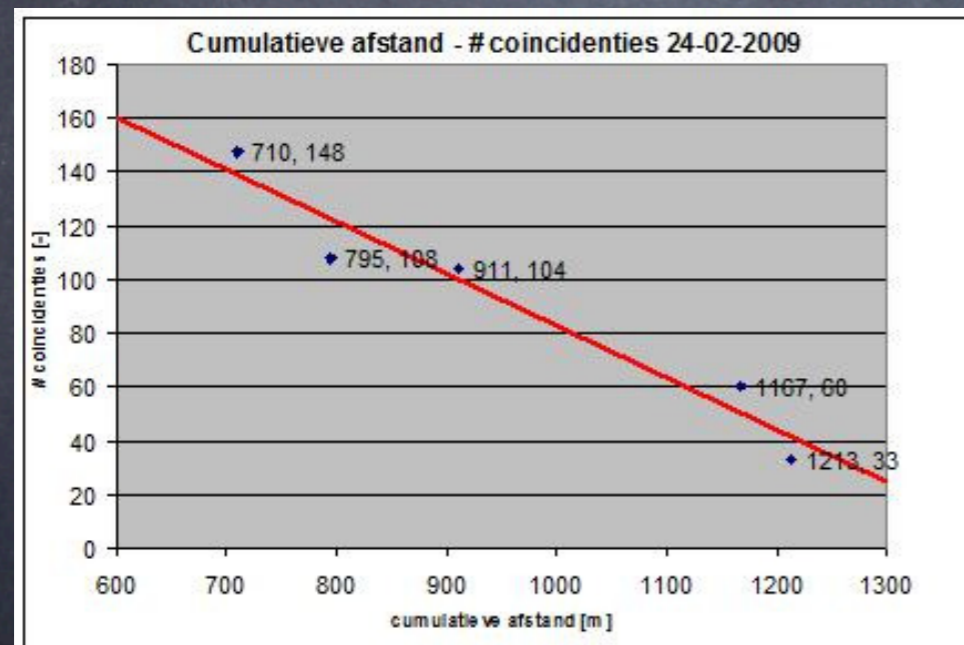




Number of coincidences
as function of time interval



Number of coincidences as function of time interval



Number of coincidences as function of distance between stations

Kosmische Straling

een module NLT



Cor Heesbeen
Connie Morsing
Jef Colle[†]
Charles Timmermans



Cluster Utrecht

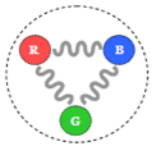
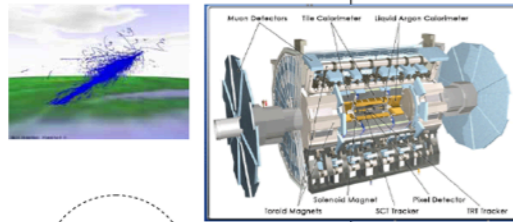
Inhoud

- Kosmische straling**
- 1 Oorsprong
 - 1.1 [Steenshate](#)
 - 1.2 [Onderzoek](#)
 - 1.3 [Bronnen](#)
 - 2 Interactie met aardatmosfeer
 - 2.1 [Elementaire deeltjes](#)
 - 2.2 [Muon-verval](#)
 - 2.3 [Airshowers](#)
 - 3 Detectie
 - 3.1 [Detector](#)
 - 3.2 [Detector bouwen](#)
 - 3.3 [Detector testen](#)
 - 3.4 [Detectiestation](#)
 - 3.5 [Detectiestation installeren](#)
 - 3.6 [Detectienetwerk](#)
 - 3.7 [Richting primair deeltje](#)
 - 3.8 [Energie primair deeltje](#)
- Praktische opdrachten**
Dereferentiële
Projectopdracht
Reacties



Teaching materials

Deeltjes en hun interacties



vwo 5

- Astrodeeltjesfysica
- HiSPARC detector
- Lesmateriaal
- Routenet**
- NLT
- NiNa lesmateriaal
- Kosmische straling
- Leerlingen Symposium
- Leraar in Onderzoek

Routenet

Klik hier voor uitleg en meer informatie over Routenet.

- | | | | | |
|--------------------|--|--|--|--|
| | Spiegels | Parabolische spiegels | | |
| | Lenzen | Lenzen slijpen | | |
| Derde klas | Telescopen | De hemel | De Zon | |
| | | Het heelal | Het uitdijend heelal | Radiotelescopen |
| | | Kleur | Zonnewind | Astronomisch profielwerkstuk |
| Vierde klas | van der Waals en Wilson | Sterevoolutie | Onderzoek | Kosmische straling |
| | Botsingen | Michelson en Morley | de Broglie | Kosmische straling profielwerkstuk |
| | Detecteren | Relativiteit | Compton | Tsiereikov |
| Vijfde klas | Elementaire deeltjes | Muon-verval | Simulatie | Airshowers |
| | Deeltjes in het standaardmodel | Krachten in het standaardmodel | Niet-periodieke data verwerken | Fluorescentie |
| | Periodieke data verwerken | Detector | Detector bouwen | Detector testen |
| Zesde klas | Detectiestation installeren | Detectienetwerk | Detectiestation | Detectiestation |
| | | | Richting primair deeltje | Energie primair deeltje |
| | | | | Correlatie profielwerkstuk |

Hands-on activities

- class activities: reconstruction of shower core
- individual assignments: graduation project, e.g. determining rate of accidental coincidences
- student symposium

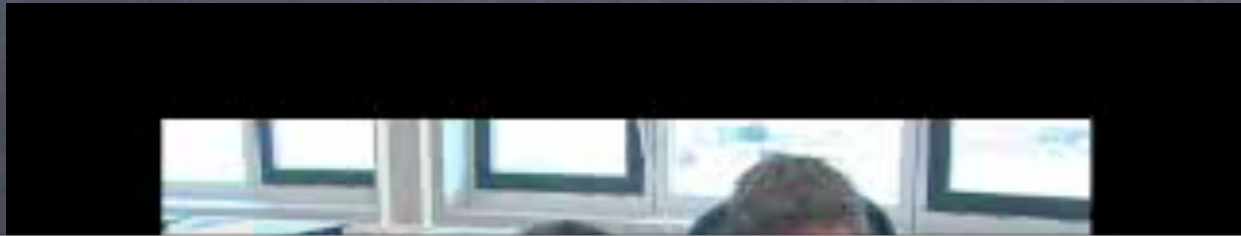


Hands-on activities



- class activities: reconstruction of shower core
- individual assignments: graduation project, e.g. determining rate of accidental coincidences
- student symposium





Hands-on activities

Student: **David**

Next event

Log energy: 14.0 22.0 **18.03**

Theta: 0.0 90.0 **9.648**

Phi: -180.0 180.0 **148.0**

Angle timings offset: -5.0 5.0 **0.0**

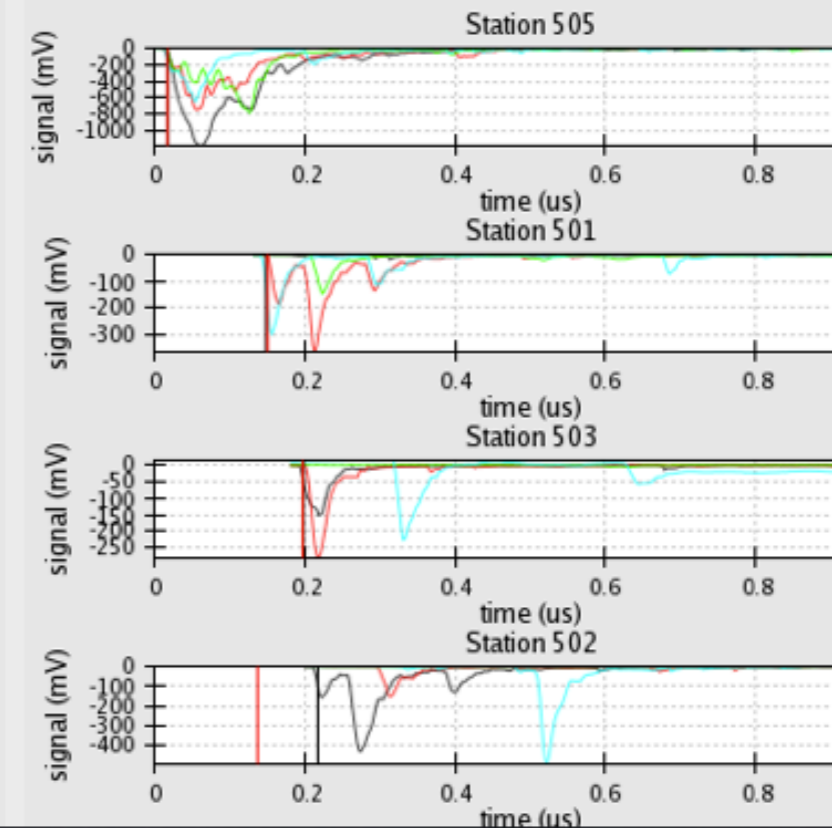
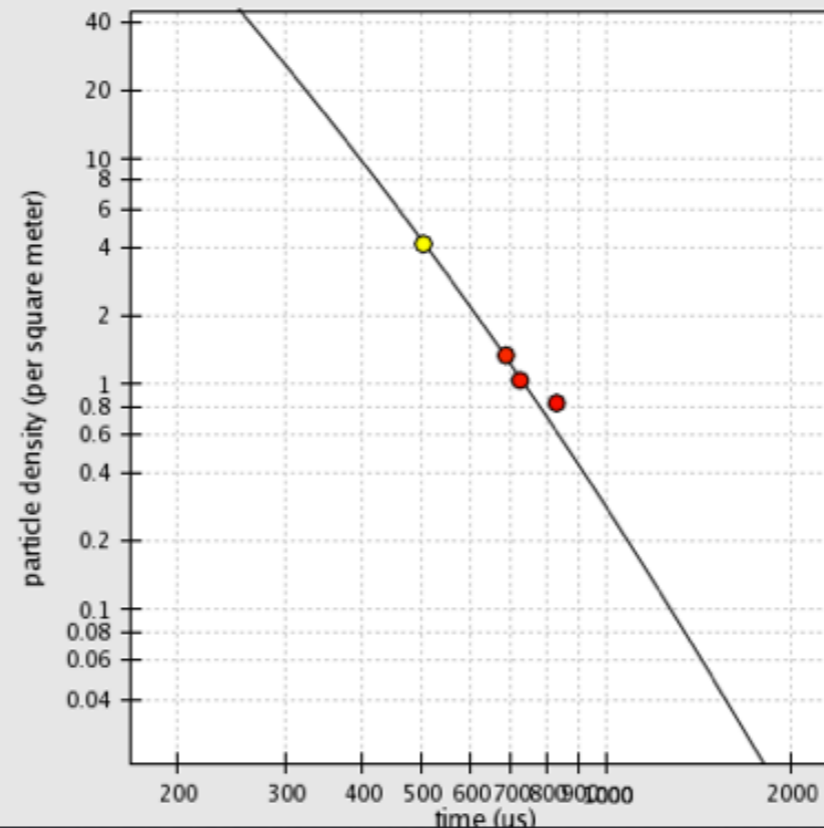
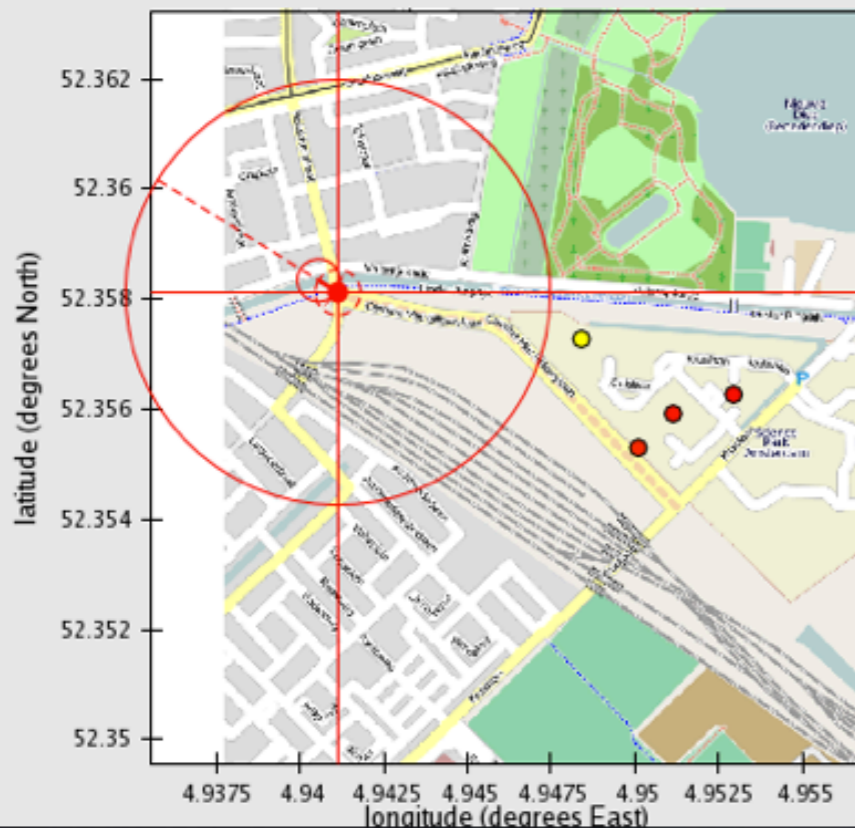
Error estimate: 0.0498875915144

Residual time difference: 0.0832615524182

Event summary: **Cluster Amsterdam Science Park at Tue Apr 27 02:09:12 2010**

Analysis summary: **Primary Energy: 1.1e+18 eV. Zenith angle: 9.6 deg, azimuthal angle: 148.0 deg. Core position: 52.35812 N, 4.94113 E**

Current rank: **You are currently ranked 1st**



Hands-on activities



- class activities: reconstruction of shower core
- individual assignments: graduation project, e.g. determining rate of accidental coincidences
- student symposium

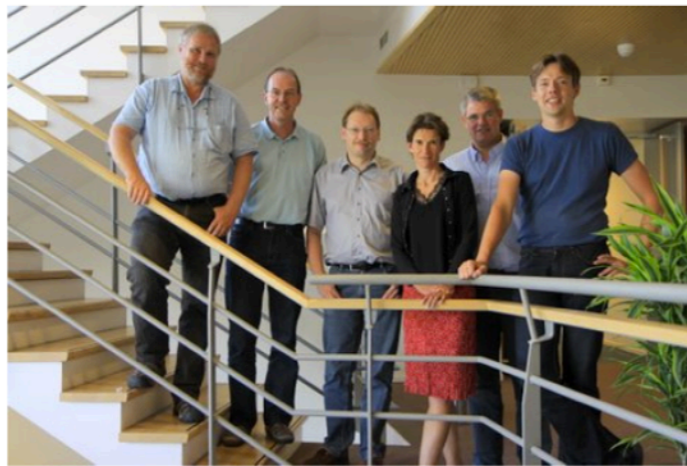


Teachers in research

‘Leraar in Onderzoek’

Hoogenergetische
Kosmische Straling

30 september 2009



‘Leraar in Onderzoek’

Hoogenergetische
Kosmische Straling

7 oktober 2010



Proposal full title:

European cosmic ray science education network

Proposal subtitle:

'Discovering, understanding and enjoying Science through Experimentation'

Proposal acronym:

EUROCOSMICS

Type of funding scheme:

Coordinating and supporting action (Coordinating)

Work programme topics addressed:

- SiS-2007-2.2.1.1 - Links between science education and research**
- SiS-2007-2.2.1.2 - Teaching methods**
- SiS-2007-2.2.2.1 - Images of Science**

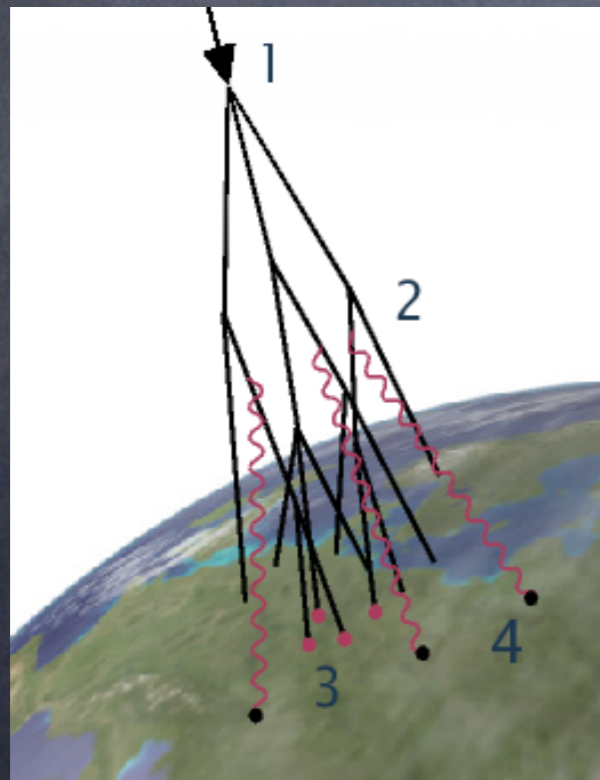
Name of coordinating person:

Prof. Dr. Ing. B. van Eijk

List of participants:

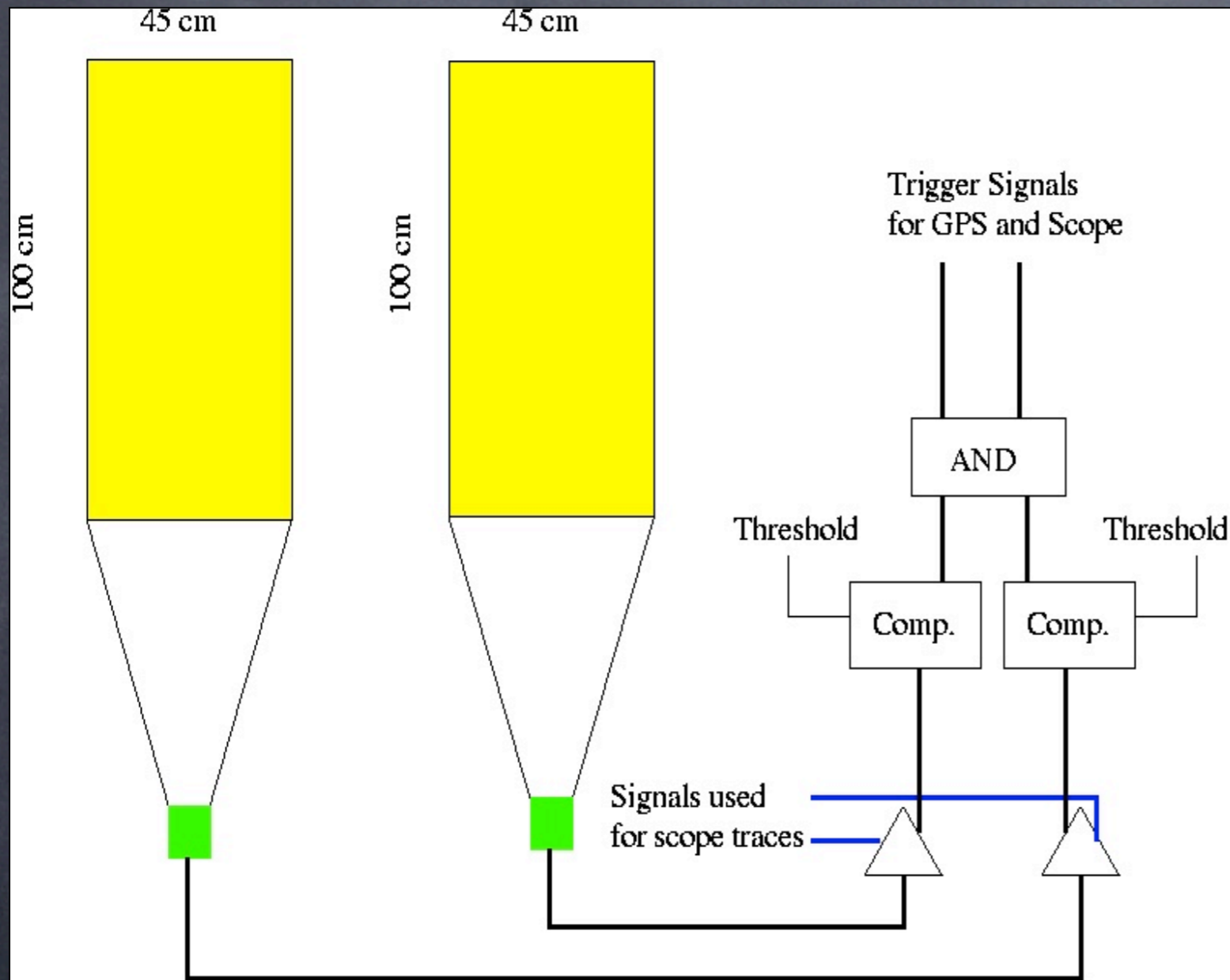
Participant No.	Participants organisation name	Country
1 (Coordinator)	FOM-Nikhef	The Netherlands
2	ULB	Belgium
3	CTU Prague	Czech Republic
4	University of Århus	Denmark
5	University of Jyväskylä	Finland
6	BUW	Germany
7	HOU	Greece
8	University of Catania	Italy
9	IPJ	Poland
10	LIP	Portugal
11	ISS	Romania
12	MEPhI	Russia
13	Alcalá University	Spain
14	KTH	Sweden
15	University of Sheffield	UK

LOFAR



geosynchrotron radiation
as a signal for airshowers

Student-built HiSPARC detectors

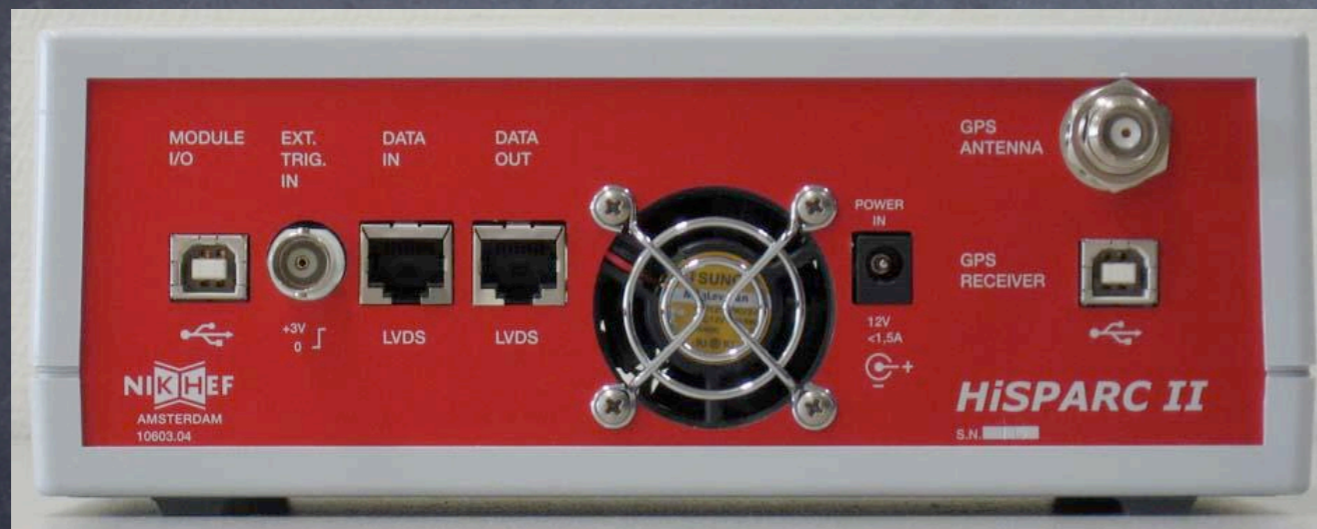


Scintillator plates in coincidence

HiSPARC electronics



front

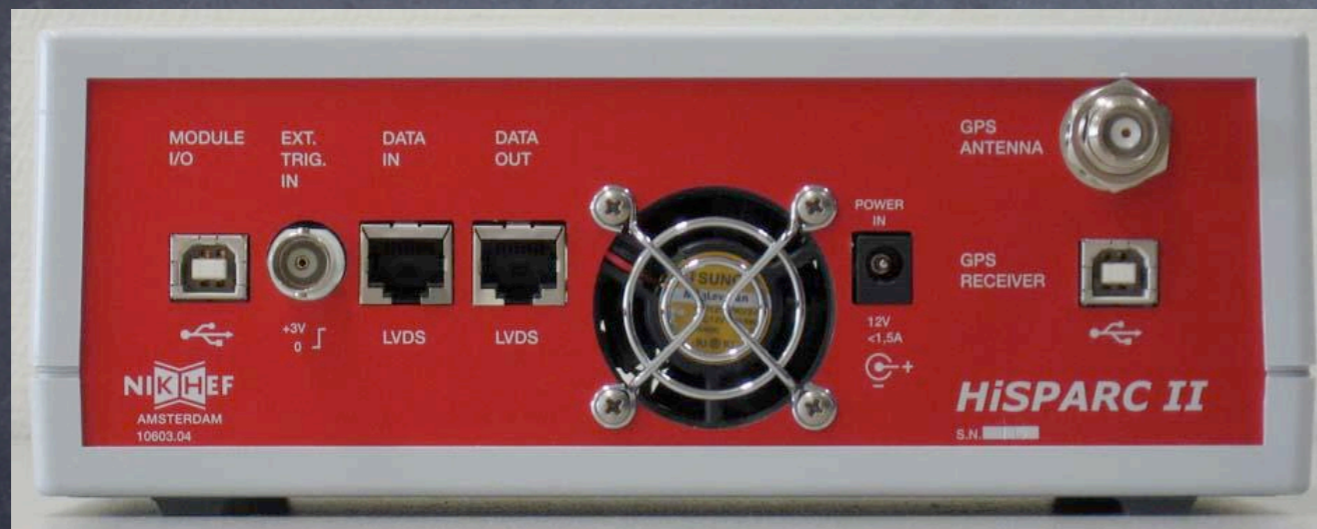


back

HiSPARC electronics



front



back



connections for external apparatus:
weather station, lightning detector, ...