

Estonian participation in the CERN programmes

Mait Müntel

Estonian Teachers Programme 2012
19. okt 2012

Участие Эстонии в программах CERN

Mait Müntel

Estonian Teachers Programme 2012
19. okt 2012

Eesti osalemine CERNi programmides

Mait Müntel

Estonian Teachers Programme 2012
19. okt 2012

Eesti osakestefüüsikute teadusrühm

- ~15 teadlast, rühma juht prof. Martti Raidal
- Millega tegeleme:
 - Eksperimentaalne osakestefüüsika (CMS @ CERN)
 - Teoreetiline osakestefüüsika: neutriinofüüsika, leptogenees, tumeaine mudelid jms
 - Astro-osakestefüüsika: kosmiliste kiirte füüsika, tumeaine otsimine kosmiliste kiirte abil jms
 - Infotehnoloogia osakestefüüsika jaoks
- Eestis asume Tallinnas, KBFi-s
- Meil on ühine **tippkeskus** Tõravere kosmoloogidega (J. Einasto)





1995

2000

2005

2010

2012



National Institute of
Chemical Physics and Biophysics

Endel Lippmaa



Memorandum of
Understanding

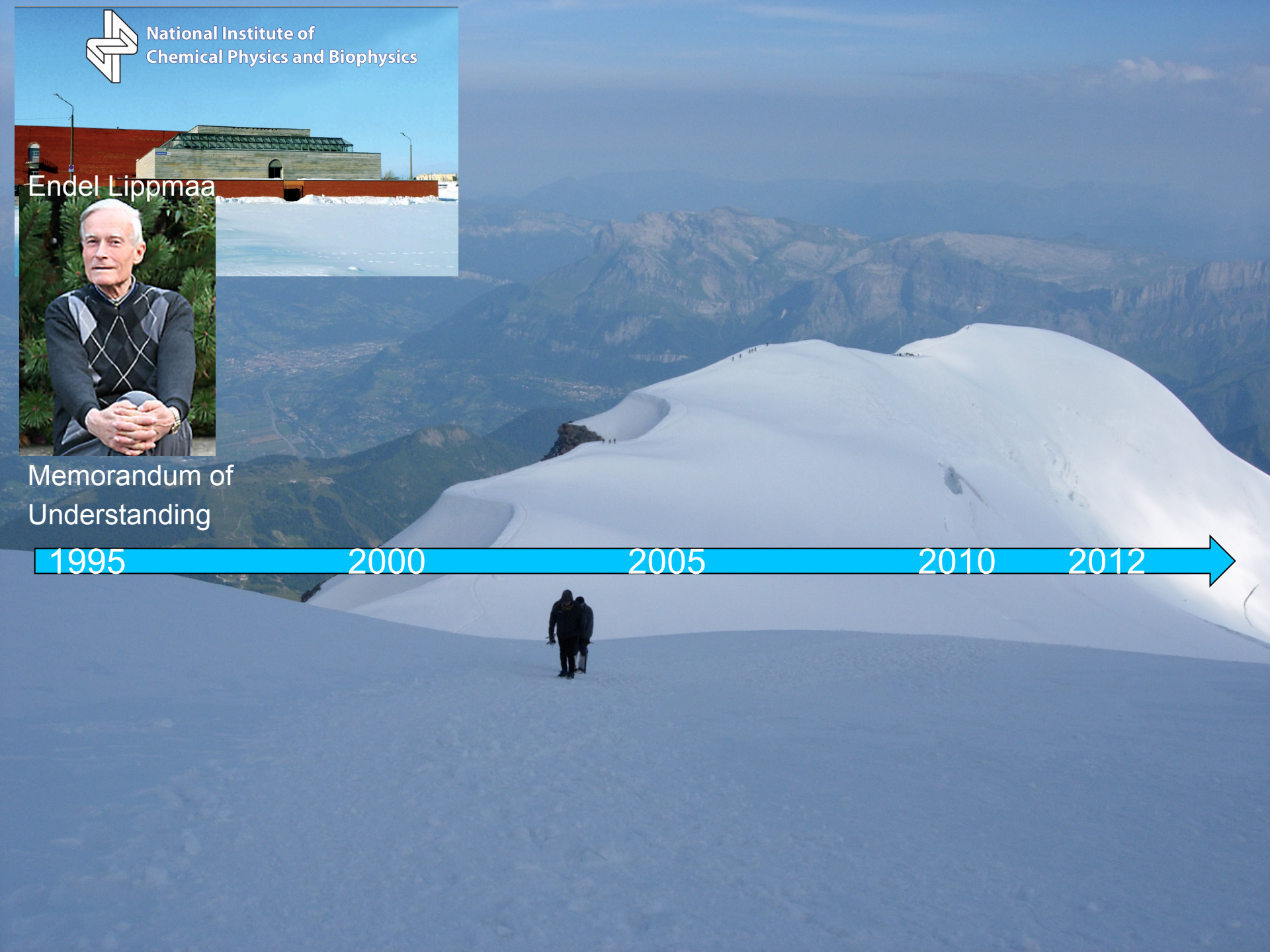
1995

2000

2005

2010

2012





National Institute of
Chemical Physics and Biophysics

Endel Lippmaa



Memorandum of
Understanding

1995

2000

2005

2010

2012

Rego Ostonen

1995-1998 CERN (1992-1998) Helsinki

Martti Raidal

2001-2001 CERN (1992-2001 Helsinki, Valencia, DESY, Riverside)



National Institute of
Chemical Physics and Biophysics

Endel Lippmaa



Memorandum of
Understanding

1995

2000

2005

2010

2012



Rego Ostonen

1995-1998 CERN (1992-1998) Helsinki

Martti Raidal

2001-2001 CERN (1992-2001 Helsinki, Valencia, DESY, Riverside)





National Institute of
Chemical Physics and Biophysics

Endel Lippmaa



Memorandum of
Understanding

1995

2000

2005

2010

2012

2004 - ... CERNi Suvetudengite Programm

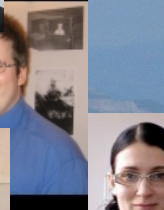
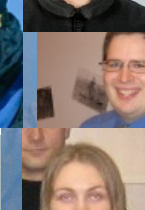
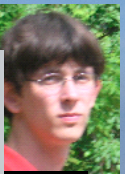
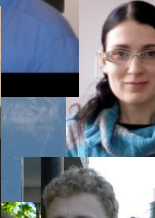
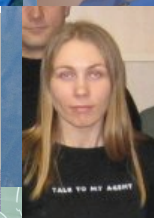


Rego Ostonen

1995-1998 CERN (1992-1998) Helsinki

Martti Raidal

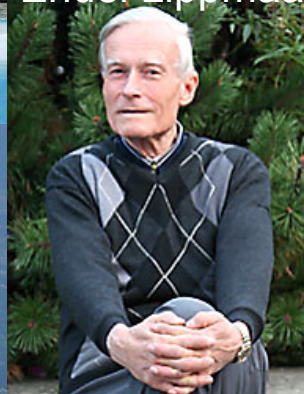
2001-2001 CERN (1992-2001 Helsinki, Valencia, DESY, Riverside)





National Institute of
Chemical Physics and Biophysics

Endel Lippmaa



Memorandum of
Understanding

1995

2000

2005

2010

2012

2004 - ... CERNi Suvetudengite Programm

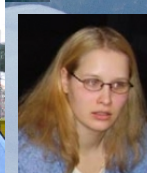
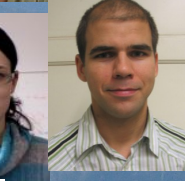
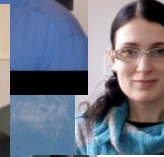
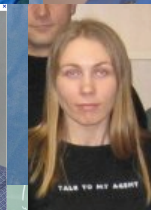
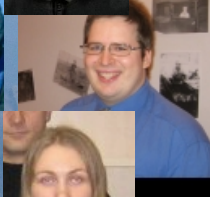
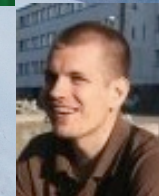
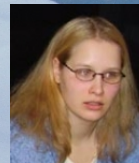


Rego Ostonen

1995-1998 CERN (1992-1998) Helsinki

Martti Raidal

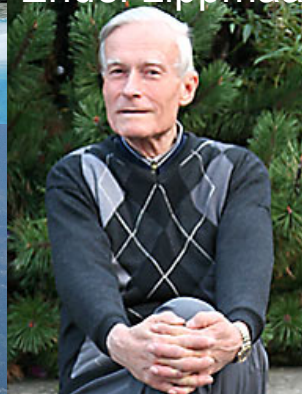
2001-2001 CERN (1992-2001 Helsinki, Valencia, DESY, Riverside)





National Institute of
Chemical Physics and Biophysics

Endel Lippmaa



Memorandum of
Understanding



2004 - ... CERNi Suvetudengite Programm

1995

2000

2005

2010

2012



Rego Ostonen

1995-1998 CERN (1992-1998) Helsinki

Martti Raidal

2001-2001 CERN (1992-2001 Helsinki, Valencia, DESY, Riverside)





National Institute of
Chemical Physics and Biophysics

Endel Lippmaa



Memorandum of
Understanding



2004 - ... CERNi Suvetudengite Programm

1995

2000

2005

2010

2012



Rego Ostonen

1995-1998 CERN (1992-1998) Helsinki

Martti Raidal

2001-2001 CERN (1992-2001 Helsinki, Valencia, DESY, Riverside)

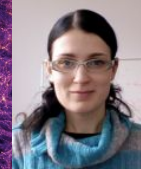
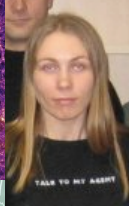
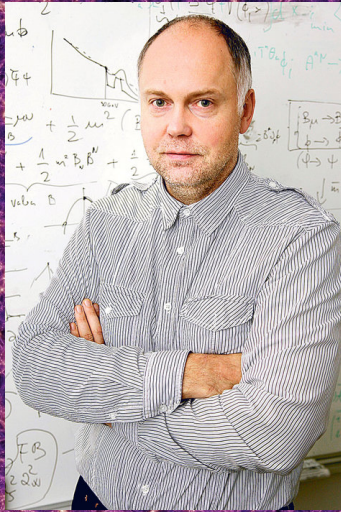


2011 - ...

CERNi õpetajate programm



Meie tööühm



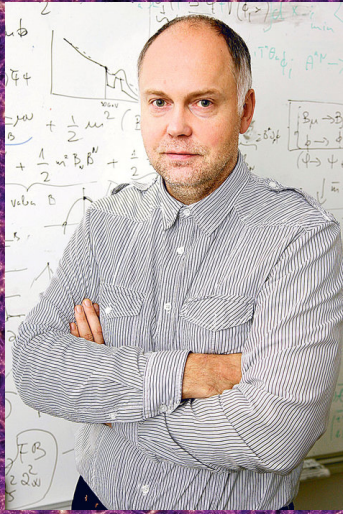
2005

2010

2012

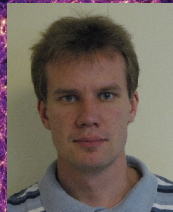
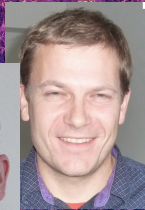
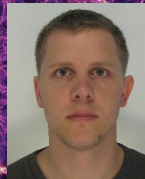
Professor:
Martti Raidal

Meie tööühm



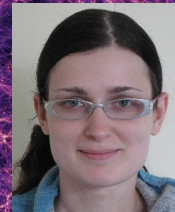
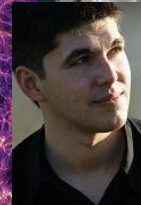
2005

Professor:
Martti Raidal



PhD kaitsmised:
Andi Hektor
Mario Kadastik
Kristjan Kannike
Mait Müntel
Liis Rebane

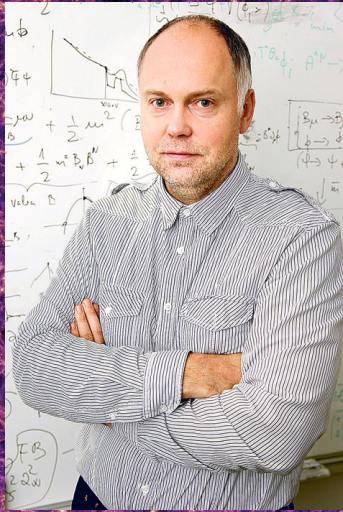
2010



2012



Meie töörühm



järeldoktorid:

Marco Patriarca

Yuji Kajiyama

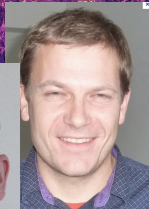
Antonio Racioppi

2005

2010

2012

Professor:
Martti Raidal



PhD kaitsmised:

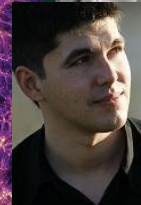
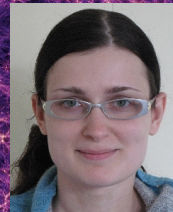
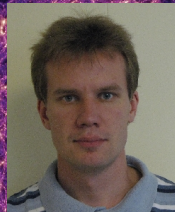
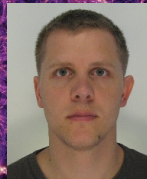
Andi Hektor

Mario Kadastik

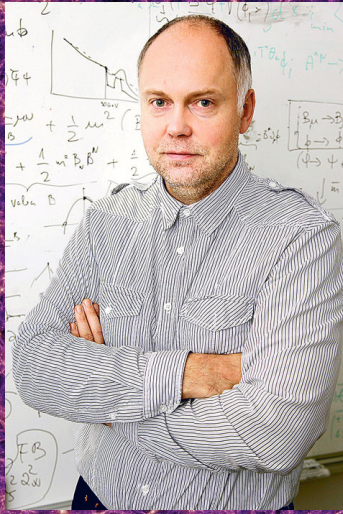
Kristjan Kannike

Mait Müntel

Liis Rebane



Meie töörühm



2005

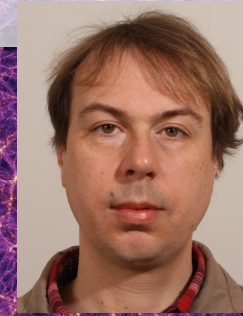
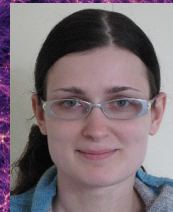
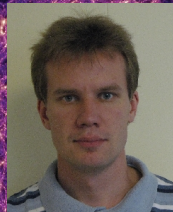
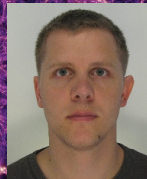
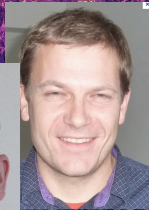
Professor:
Martti Raidal



järeldoktorid:
Marco Patriarca
Yuji Kajiyama
Antonio Racioppi

2010

PhD kaitsmised:
Andi Hektor
Mario Kadastik
Kristjan Kannike
Mait Müntel
Liis Rebane



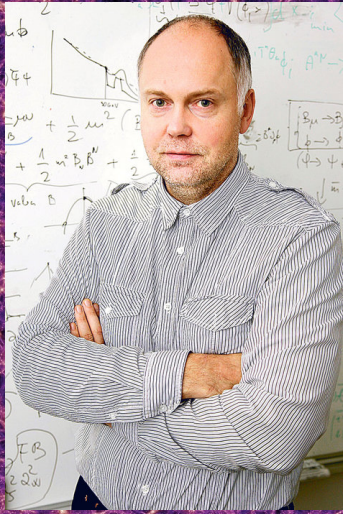
tippteadlased:
Alessandro Strumia
Andrea Giammanco
Emidio Gabrielli



2012

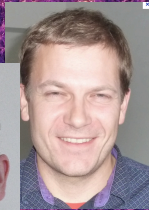


Meie töörühm

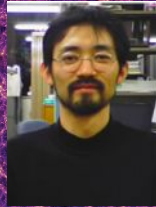
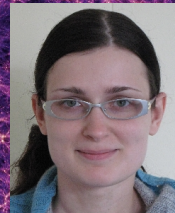
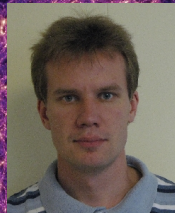
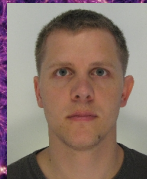


2005

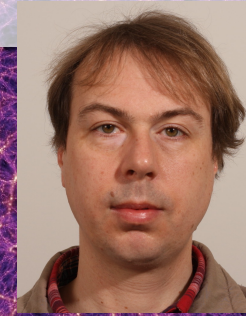
Professor:
Martti Raidal



PhD kaitsmised:
Andi Hektor
Mario Kadastik
Kristjan Kannike
Mait Müntel
Liis Rebane



järeld doktorid:
Marco Patriarca
Yuji Kajiyama
Antonio Racioppi

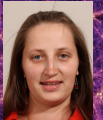
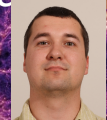
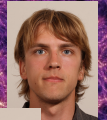


tippteadlased:
Alessandro Strumia
Andrea Giammanco
Emidio Gabrielli

2010

2012

Tudengid:
Marion Murumaa
Joosep Pata
Andres Tiko
Siim Ainsaar
Hardi Veermäe
Morten Piibeleht



CERN & meie töörihm

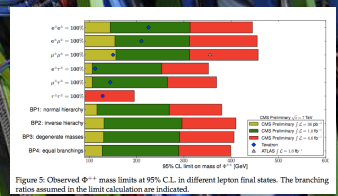
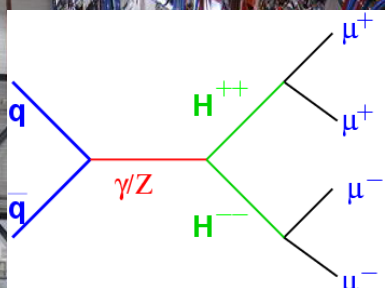
• CMS eksperiment
• arvutuskeskus
• teooria



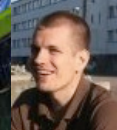
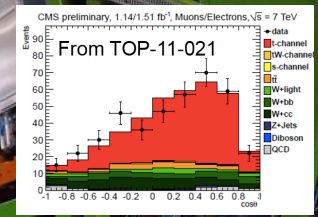
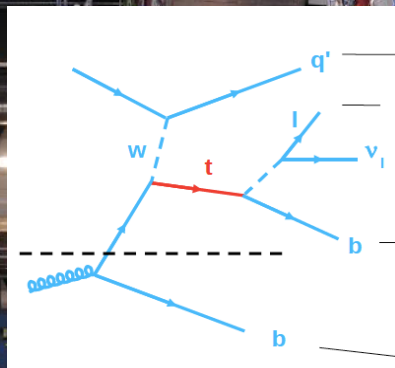
Oleme osalised CMS eksperimendis:



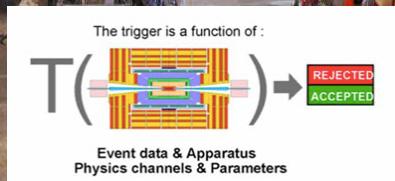
Topeltlaetud Higgs



Single Top



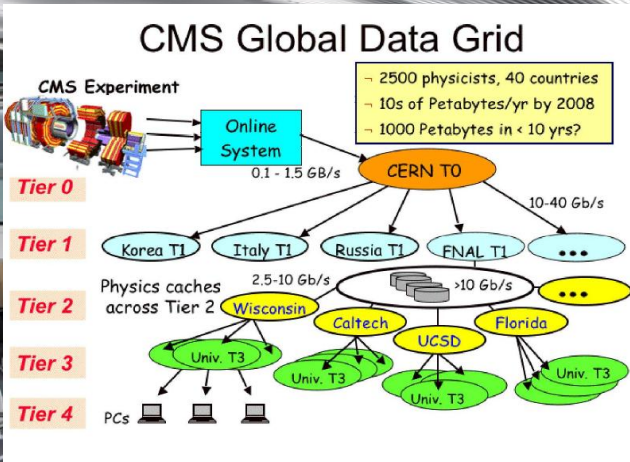
Trigger



DQM



KBFI arvutuskeskus "Estonian Tier 2"



Asukoht Tallinn (Mustamäe)

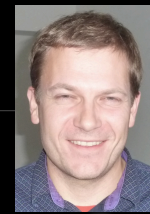
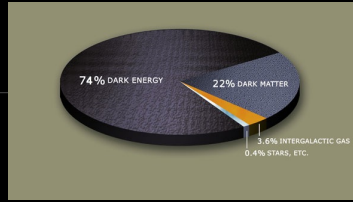
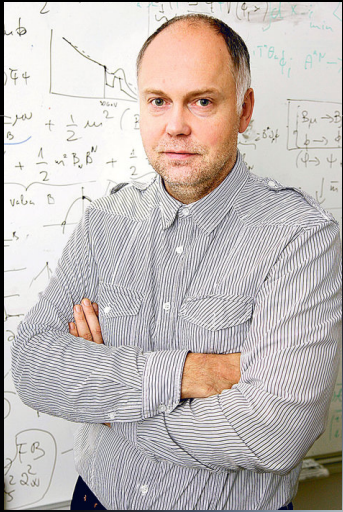
- 2005 Balti Grid I (VI Euroopa raamprogramm)
- 2007 KBFI & CERNi koostöö
- 2008 Balti Grid II (VII Euroopa raamprogramm)
- 2009 EGI (European Grid Initiative)
- 2010 ETAIS (Eesti teadusarvutuste Infrastruktuur)



"Estonian Tier 2" praegu:

- 5300 tuuma (cores)
- 2000 TB (storage)
- 10% eesti interneti liiklusest

Estonian Tier 2 – üks suuremaid Tier 2-sid maailmas



Teoreetiline osakestefüüsika:

neutriinofüüsika,
 leptogenees
 tumeaine mudelid jms
 fenomenoloogiline osakestefüüsika

Suur Pauk!

Astro-osakestefüüsika:
 tumeaine otsimine kosmiliste kiirte abil
 univesumi struktuur, kosmoloogia
 galaktikate füüsika



Universumi
 sünd



13.7 miljr. aastat

10^{28} cm





Aitäh!