

# Outreach – particle and nuclear physics

Presentation for RECFA – Restricted European Committee for Future Accelerators

**Vladimír Wagner**

Nuclear Physics Institute of CAS Řež, Faculty of Nuclear Sciences and Physical Engineering of CTU

E\_mail: WAGNER@UJF.CAS.CZ

- 1) Intensive cooperation with CERN
- 2) National outreach
- 3) Not only students but also public
- 4) Not only the biggest accelerators but also smaller
- 5) Not only particle physics but also nuclear physics and applications
- 6) Long tradition of popularization of astronomy and also related subjects
- 7) Usage of internet, journals, newspapers, TV ...
- 8) Conclusions and outlooks



Masterclasses – Gymnasium Pardubice 2015

# Intensive cooperation with CERN

- 1) 60 years anniversary
- 2) The national teacher program
- 3) CERN visits for secondary school students
- 4) Masterclasses – hands on particle physics



Czech teachers at CERN



Interactive CERN exhibition 2014



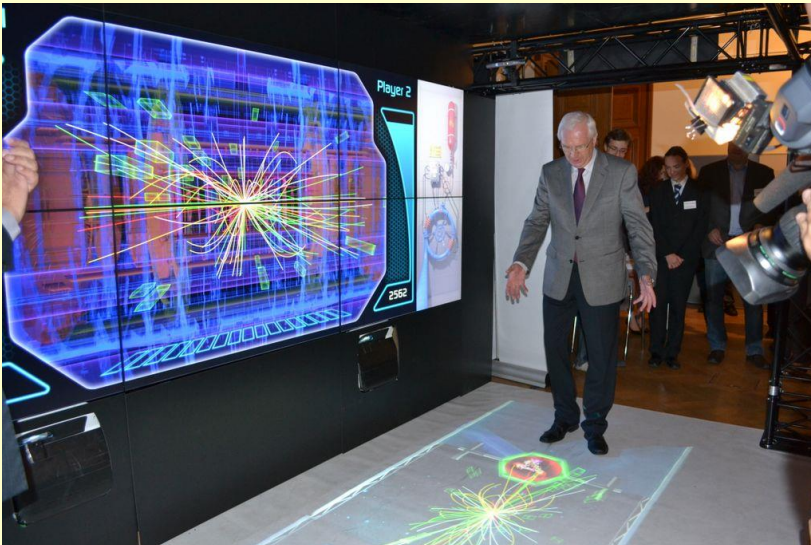
Masterclasses on FNPS of CTU (2015)



- 1) Special interactive exhibition
- 2) Visit and lecture of Rolf-Dieter Heuer
- 3) Special seminar day for students (before noon) and specialists (afternoon)
- 4) Seminar about possible work at CERN
- 5) CERN accelerator school
- 6) Many seminars and lectures for schoolchildren, students and public



Students (Gymnasium Jeseník) with Rolf-Dieter Heuer during his visit at Prague



Opening ceremony of special interactive exhibition about CERN (Czech Academy of Sciences)

# Czech National Teachers Program



# Secondary school student visits at CERN

(very often organized by participants of National teachers program or participants of excursions in Czech nuclear laboratories)



Wichterlovo gymnasium, Ostrava - Poruba, 2014



Gymnasium Botičská, Praha, 2014



Gymnasium Šlapanice



Gymnasium Mikuláše Koperníka, Bílovec, 2014

# International Masterclasses – hands on particle physics

FNSPE of the CTU – on faculty,  
mainly ALICE (2012 – 2015)

(students from more than 40 secondary schools  
participated)

FMP of the Charles University – on  
secondary schools, mainly ATLAS  
(2005 – 2015)

(Czech specialty now – visits with  
Masterclasses in secondary schools)



This year's Masterclasses on FNSPE of the CTU (ALICE)



Masterclasses – Gymnasium Jeseník, students are working with ATLAS data

# Presentations for schoolchildren and students

Only during first three months of this year we had more than twenty lectures and other events for secondary school students



Gymnasium Pardubice (October 2014)



Gymnasium Žďár nad Sázavou

One example of last presentations for secondary school students (March 9, 2015):  
(together with student which already started university study)



March 9, Gymnasium Ostrava Zábřeh, student of Czech Technical University Ondřej Kořistka  
(students of this secondary school will visit CERN at May)

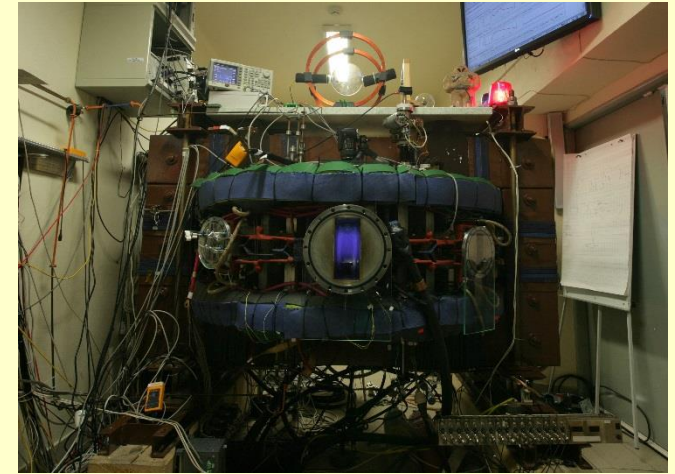
# Presentations for public (science centres and libraries)

Examples of traditional every year events:

- 1) Science week (Czech Academy of Sciences)
- 2) Days with nuclei (Techmania Plzeň)
- 3) Day in FNSPE
- 4) Science week on Nuclear faculty

Many lectures and presentations during whole year

Big attraction of Science week on FNSPE is tokamak GOLEM



Science week of CAS (neutrino presentation)



Observatory Zlín, LHC presentation



# Not only the biggest accelerators but also smaller



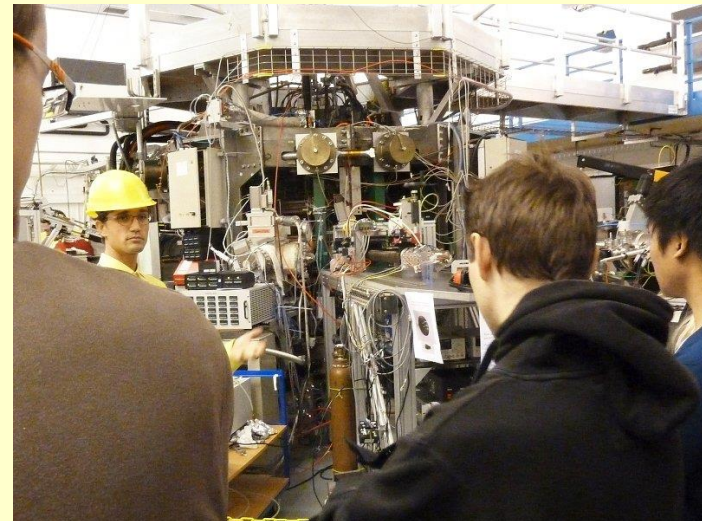
Old Van de Graaff is in National Technical Museum now



Cyclotron of NPI (photo taken by students)



Excursion in Tandatron Laboratory (NPI)



Not only accelerators but also tokamaks (excursion in IPP)

# Czech particle and nuclear laboratories are open for public

Week of science  
(CAS)

Open days  
every year

(hundreds of visitors)  
(NPI 2013 – 433 per day)

Excursions during  
whole year



Science week - „Days of open doors“ – organized together with other research institutions

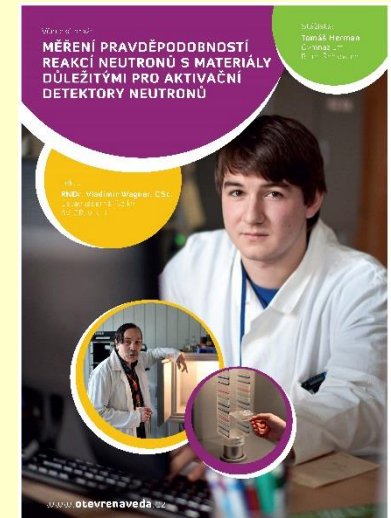
# Not only particle physics but also nuclear physics and application



Exhibition of results of Tycho Brahe remnants investigation by nuclear analytical methods



Excursions (research reactors LR0 and LVR15 (NRI))



Project „Open science“ for secondary school students

# Long tradition of astronomy popularization (and related subjects)



Observatory Petřín, Praha



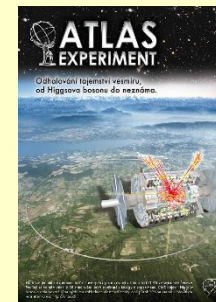
Famous promoter of astronomy and particle physics is  
Jura Grygar (Observatory Valašské Meziříčí)



From tradition to new modern era: Techmania Plzeň, Observatory and Planetarium Brno

# Internet science portals, journals, newspapers, TV, ...

- 1) Internet science outreach: Osel, Aldebaran ...
- 2) Journals: Vesmír, Čes. časopis pro fyziku, VTM ...
- 3) Many visits of Czech TV and newspaper teams in CERN
- 4) Many articles and reportages about CERN and particle and nuclear physics
- 5) Translation of books and brochures for public (J. Adam ...)



Petr Kulhánek in J. Suchánek broadcast of TV Noe (Deep of Universe)

# How Czech Republic is covered by our outreach events

(only examples from last years)



27 lecturers  
6 lecturers more than 5 events  
104 events for school students and public

# Conclusions and outlooks

- 1) Long tradition of popularization of sciences in Czech Republic (also particle physics, mainly connection to astrophysics and cosmology)
- 2) Intensive international cooperation, mainly with CERN and IPPOG (for example Czech HEP community organized also meeting EPPCN last year)
- 3) Intensive cooperation between Czech universities and research institutes
- 4) Intensive cooperation between particle, nuclear and astrophysics communities
- 5) Many traditional events but also looking for new ways
- 6) Particle and nuclear physics popularization has relatively very good position
- 7) Czech Republic – industrial and developed country – well educated young people are needed – also our science outreach helps to have enough students in this field

