

# Nuclear and particle physics yesterday, today, tomorrow

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garant BS/NMS

doc. Petráček v roku 2005 prišiel s plánom na FJFI ČVUT etablovať časticovú fyziku Koncept 2005-2015

EJF (2006-2013) => EJČF (2013-2020) => JČF (2020-2030)

Navazuje na prednášku z roku 2019

# Long term vision 2005+

- Standard experimental group with the structure similar to foreign universities
- Strong and complex involvement in large international collaborations
- Interconnection of experimental physics with theoretical topics developed at FNSPE
- Integration of activities in heavy ion physics in Czech republic
- Develop strong study program in heavy ion physics
- Participation in exchange activities with foreign partners
- Strong education program covering broad spectrum of nuclear and particle physics problems researched in Czech republic
- Developing special physics practicum involving the students to the important problems already at FNSPE

# Main directions of development

- Two pillars: heavy ion physics and high energy particle physics
- Activities of interest:
  - Complex data analysis from experiments
  - Development of algorithms and methods for data analysis
  - R&D of detectors + maintenance of existing detectors
  - Phenomenology and theoretical research related to our experimental work
- Each experimental group has 1-3 senior members+ 1 theorist + 1-2 postdocs+ 2-3 PhD students + 2-5 students

# Important milestones

- Project of [CFRJS](#) 2007-2012 FJFI+UJF (ALICE+STAR+Nemcik/Tomasik)
- Post doctoral project [OPVK](#) 2012-2015 (Trzeciak, Eyyubova, Broz, Cepila, Myska)
- Collaborative projects [MŠMT INGO](#), [Interexcellence CERN](#), [BNL](#) (till 2022)
- Project [THOR/COST](#) 2016-2021 phenomenology
- Projects of [GAČR](#) (past: Bielcik, Contreras, Tomasik, Siodmok ; current: Tomasik, Cepila, Trzeciak)
- Vznik velkých infrastruktur v 2016 ([BNL-CZ](#), [CERN-CZ](#), [FAIR-CZ](#) ) + [OPVVV BNL-CZ \(2016-2019\)](#)
- [OPVVV-Mobility](#): Gajdosova (till 2021), Karpenko (ends 2022), Krelina (end 2022)
- [SGS CVUT](#) projects ALICE, STAR, PHENO ongoing
- [CAAS project](#) 2018-2023: PARTPHYS (workshops, ICHEP2020, MPI@LHC 2019, HYP2022, ISS2022...)

# Nuclear and Particle Physics today

- ALICE: Guillermo Contreras Nuno, JB, Karel Šafařík, Vojtěch Petráček, Michal Broz, *(Katarína Gajdošová K.), Solangel Rojas, Arvind Khuntia*
- STAR: Jaroslav Bielčík, Petr Chaloupka, Barbara Trzeciak, (Jana B.), *Leszek Kosarzewski Olena Mezhenska*
- ATLAS: Zdeněk Hubáček, Miroslav Myška, *Henry-Ann Day-Hall*
- Fenomenologia: Boris Tomášik, Jan Nemčík, Jan Čepila, *(Michal Křelina), Yuri Karpenko, Jaroslava Óbertová*
- CBM: Petr Chaloupka *(+Lukáš Chlad)*
- Support: Libor Škoda, Zdenka Císlerová

ROOM 13A use it or loose it

All students: Bc 10 (16), NMS 15 (23), Phd 29 (22)      2022 (2019)

# EJČF/JČF – state exam committee

## **Bc.**

doc. Mgr. Jaroslav Bielčík, Ph.D. – předseda  
RNDr. Vladimír Wagner, CSc. – místopředseda  
RNDr. Petr Chaloupka, Ph.D.  
Ing. Zdeněk Hubáček, Ph.D.  
Ing. Jan Čepila, Ph.D.  
prof. Ing. Igor Jex, DrSc.  
Ing. Jaroslav Novotný, Ph.D.  
doc. Michal Šumbera, CSc., DSc.  
Ing. Marcela Mikeščíková, Ph.D.

## **Mgr.**

prof. Mgr. Boris Tomášik, Ph.D. – předseda  
doc. RNDr. Jana Bielčíková, Ph.D. - místopředseda  
doc. RNDr. Ján Nemčík, CSc.  
prof. Guillermo Contreras Nuno, Ph.D.  
Mgr. Michal Broz, Ph.D.  
Ing. Miroslav Krůs, Ph.D.  
dr. Barbara Antonina Trzeciak, Ph.D.  
doc. Mgr. Martin Spousta, Ph.D.  
doc. RNDr. Anna Macková, Ph.D.  
RNDr. Vladimír Wagner, CSc.

This year in NMS we first 4 students finished withing **NEW JČF accreditation**: Češka, Lomický, Denner, Šterba  
In BS program we have currently still finishing students in last year.

# JČF - tomorrow

- In sustainable way improving our quality
- Successfully complete **CAAS project**
- Preparation of **OPJAK project** (ATLAS+ALICE in FzU proposal, STAR+pheno in CVUT proposal)
- Increase success rate in **GACR** and **HORIZONT** projects
- Monitoring of **quality** in impact of new accreditation
- Continuously improving the **experimental practicum**
- Increasing number of lectures in accelerators
- Keeping competences in nuclear physics



# EJČF – tomorrow concerns

- Most likely we can not easily grow in numbers of permanent positions
- We should attract the grant money in sufficient and effective way
- We have reasonable age structure, but very badly balanced in gender (shame)
- Evaluation of collaborative papers
- Number of the students is finite and there are many other great schools and topics around. We need to attract all possible talented students with potential interest to nuclear and particle physics and make them successful for academic and non-academic life.

**NO STUDENTS = NO UNIVERSITY**



# Students

- 2019: V súčasnosti každý rok nastupuje do prveho ročníka EJCF cca 50-55 studentov, do magisterskeho studia nastupuje 8 az 12 studentov, do doktorskeho studia 0-2 studenti rocne. Mali by sme sa snazit toto cislo udrzat a zvyisit pocet doktorantov.

We still keep 8-12 students entering NMS study and about 2 starting PhD

- 2022 official numbers: BS: I-54; II-39; III+ - 16 NMS: I-7 II-14
- PhD:5+24
- Finished in 2022: 9 +9
- We need to outreach our work among high school students in effective way to keep us visible
- We have better understand what happen between BS 54->9 **1/6 survive**

# MasterClasses

- <https://mc.casticova-fyzika.cz/>
- Usually in February/March 1 friday
- ATLAS+ALICE exercise
- JB, Miroslav Myška, Boris Tomášik
- Monika Robotková, Marie Majerová  
+ about 15 other students
- We have usually about 50 participants
- 2 lectures + hand on analysis +  
video konference with CERN





# Stan se na den vědkyní

- **International Day of Girls and Women in Science** (14.2)
- Physics **≠** ONLY WHITE MALE job.
- Involving **female scientists and students**
- Collaborating with quantum tech., mathematics, electronics and FEL in this event.
- **Panel** with our female colleagues (Hronová)
- Networking **dinner** at the evening
- Large participation and really great feedback
  
- Special MasterClasses + cloud chamber workshop





- Week about particle physics for high school students
- 32 students selected from 75 applications
- Collaboration of CVUT, MFF, FzU and UJF AV ČR
- We need to offer about 5 miniprojects – 2x4 hours + presentation
- Help to organize some other activities at FNSPE
  
- Volunteers needed NOW.

# What is important for you?

- Any concerns about your life at CTU?
  - Any concerns about some classes/exams?
  - Any concerns about us – your senior colleagues/junior colleagues?
  - Any concerns about your future?
  - Do you have enough support to do your thesis?
  - Do you have enough money to survive?
  - Do you have enough work to do?
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- Are you feeling good? Are you happy? Should you be happy?
  - WHAT can you do for us and what can we do for you?