

# GravWave – Detection of gravitational waves

Michael Prouza,  
FZU - Institute of Physics  
of the Czech Academy of Sciences

# Large research infrastructures

- Program for a long-term financing of large experiments
- Roadmap of research infrastructures exists (44 in total, 17 in physics)
- Review every 4 years, requests for 8 years (now 2027-2034)
- Financing of operations, investment money separately
- Cap for all infrastructures together – 1.7 billion CZK / year
- Hopefully will be raised to at least 2.5 billion (starting 2027)



---

# Roadmap of Large Research Infrastructures of the Czech Republic for the years 2023–2026

---

Ministry of Education, Youth and Sports



## Physics

- [AUGER-CZ](#)
- [BNL-CZ](#)
- [CEMNAT](#)
- [CEPLANT](#)
- [CERN-CZ](#)
- [CTA-CZ](#)
- [CzechNanoLab](#)
- [ESS Scandinavia-CZ](#)
- [EST-CZ](#)
- [EU-ARC.CZ](#)
- [FAIR-CZ](#)
- [Fermilab-CZ](#)
- [LSM-CZ](#)
- [MGML](#)
- [PALS](#)
- [SPIRAL2-CZ](#)
- [SPL-HTC](#)

## Energy

- [CICRR](#)
- [COMPASS](#)
- [ENREGAT](#)
- [WCZV](#)

## Health and Food

- [BBMRI-CZ](#)
- [CCP](#)
- [CIISB](#)
- [CZECRIN](#)
- [CZECH-BIOIMAGING](#)
- [CZ-OPENSOURCE](#)
- [EATRIS-CZ](#)
- [ELIXIR-CZ](#)
- [METROFOOD-CZ](#)
- [NCMG](#)

## Social Sciences and Humanities

- [AIS CR](#)
- [CLB](#)
- [CNC](#)
- [CSDA/ESS-CZ](#)
- [GGP-CZ](#)
- [LINDAT/CLARIAH-CZ](#)
- [SHARE-CZ](#)

## Environment

- [ACTRIS-CZ](#)
- [CENAKVA](#)
- [CzeCOS](#)
- [NanoEnvicZ](#)
- [RECETOX RI](#)

## eInfrastructures

- [e-INFRA CZ](#)

# New infrastructure

- Pressure to combine existing infrastructures and to lower their number (e.g. AUGER and CTA will now be together Astroparticle Physics).
- However, with the new infrastructure for detection of gravitational waves we are in surprisingly good position.
- One of described so-called “gaps”.
- Good diplomatic pressure on Czechia related mostly to participation in the Einstein Telescope project.

# GravWave – Detection of gravitational waves

- Proposal for a new „**large research infrastructure**“ to secure long-term financing to be submitted by December 12
- **FZU coordinator**, co-applicants – Charles University, Masaryk University, Czech Technical University and Silesian University, Astronomical Institute, Institute of Atmospheric Physics and Institute of Thermomechanics of the Czech Academy of Sciences
- If successful, Czechia will join Einstein Telescope also on the governmental level

# FZU – current activities

- LISA – responsible for production of FSUs (Fibre Switching Units)
- DZA – Memorandum of Understanding with the German Center for Astrophysics
- ET Pathfinder – interactions with Stefan Hild and team since summer, possible involvement in control software upgrades and production of hardware (e.g. beam dumps) – by Joint Laboratory of Optics (large experience with astroparticle and particle physics experiments)
- Einstein Telescope – FZU recognized as the Research Unit two weeks ago

# FZU - core

- LISA, Einstein Telescope, ET Pathfinder
- programming, data analysis
- multi-messenger
- cosmology



# FZU – JLO

- Joint Laboratory of Optics – expertise both in classical and quantum optics, large workshops, fine mechanics and optics
- production e.g. of segmented mirrors for fluorescence telescopes and for RICH particle detectors
- possible involvement in hardware development – fine mechanics and optics, possibly some cryogenics and vacuum systems

# FZU – lasers

- HiLASE laser center – world records for power – diode-pumped lasers, also interested in special lasers, e.g. microwave holmium lasers
- also experience in production of optoelectronics, i.e. recently provided the Faraday insulator for one of ELI Beamlines lasers

# Astronomical Institute - ASU

- waveforms
- extreme inspirals
- black hole perturbation theory

# Charles University - CUNI

- Charles University, Faculty of Mathematics and Physics
- black hole systems dynamics
- modified gravities
- waveforms

# Masaryk university - MUNI

- Masaryk University in Brno, Faculty of Science
- programming
- multi-messenger studies (QUVIK)



# Other members

- Silesian University, Institute of Physics
- Czech Technical University, Faculty of Nuclear Sciences and Physics Engineering
- Institute of Atmospheric Physics, Czech Academy of Sciences (LISA)
- Institute of Thermomechanics, Czech Academy of Sciences (LISA)

# Requested budget

- 30 mil. CZK per year initially
- grows above 50 mil. CZK per year after 2030 (construction of Einstein Telescope)
- about 120 mil. CZK investments extra (Operational Programs)