Plasmon Enhanced Terahertz Electron Paramagnetic Resonance (PETER)

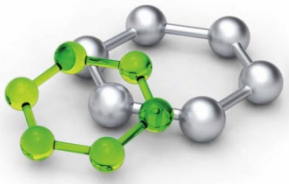
Tomáš Šikola

Institute of Physical Engineering, Brno University of Technology,

Central European Institute of Technology (CEITEC-BUT)

IPE INSTITUTE OF PHYSICAL ENGINEERING FME BUT

PETER



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Horizon 2020 - FET

- Partners: BUT, USTUTT, NANOGUNE, Thomas Keating
- Period: 1/2018 – 6/2021
- Grant: 2,898,683.75 EUR
- Funding scheme: RIA
- Proposal Nr: 767227
- Activity: FETOPEN-RIA-2017-1

Horizon 2020 - FET

FET: Interdisciplinary, Novelty, S&T targeted, Foundational, High-Risk, Long-term vision

- **Long-term vision**: a new, original or radical long-term vision of technology-enabled possibilities going far beyond the state of the art
- **Breakthrough S&T target**: scientifically ambitious and technologically concrete breakthroughs, plausibly attainable within the life-time of the project.
- **Foundational**: the breakthroughs must have the potential to become the basis for a new line of technology not currently available.
- **Novelty**: new ideas and concepts, rather than the application or incremental refinement of well established ones.
- **High-risk**: the potential of a new technological direction depends on a whole range of factors that cannot be apprehended from a single disciplinary viewpoint.
- **Interdisciplinary**: the proposed collaborations must go beyond current mainstream collaboration configurations in joint S&T research, and must aim to advance different scientific and technological disciplines together and in synergy towards a breakthrough.

Plasmon Enhanced THz Electron Paramagnetic Resonance

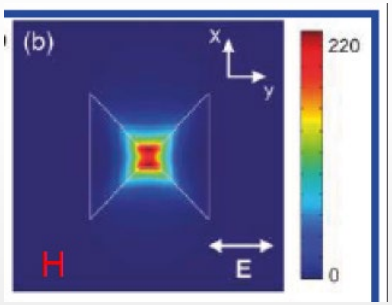
Overview

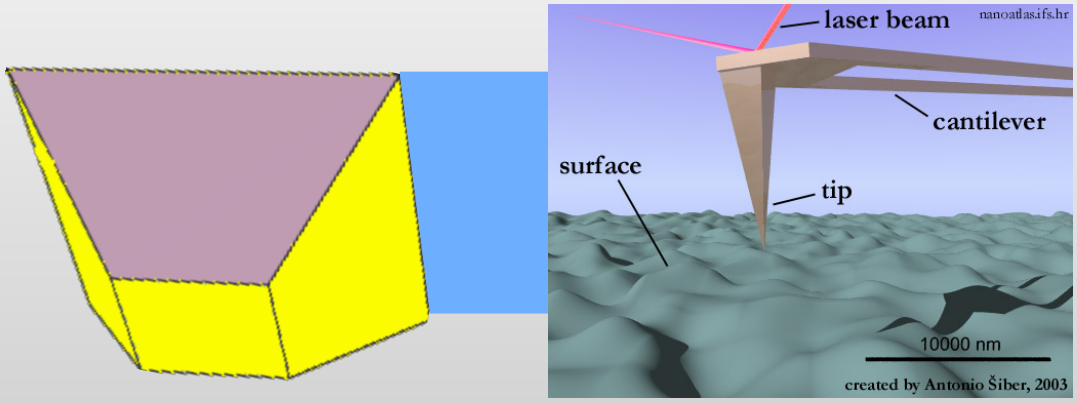
General aim:

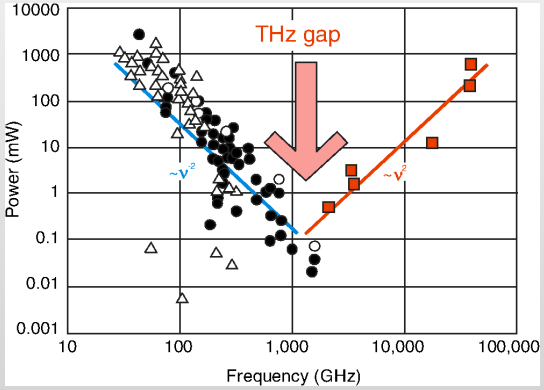
- Combine advantages of high-frequency electron paramagnetic resonance with scanning probe microscopy. Achieve a working prototype.

Novelty

- First magnetic field enhancement with plasmonic antennas (localization beyond diffraction limit)
- First scanning probe HFEPR (spatial resolution < 1 µm) .
- Closing of the THz gap (higher sensitivity)

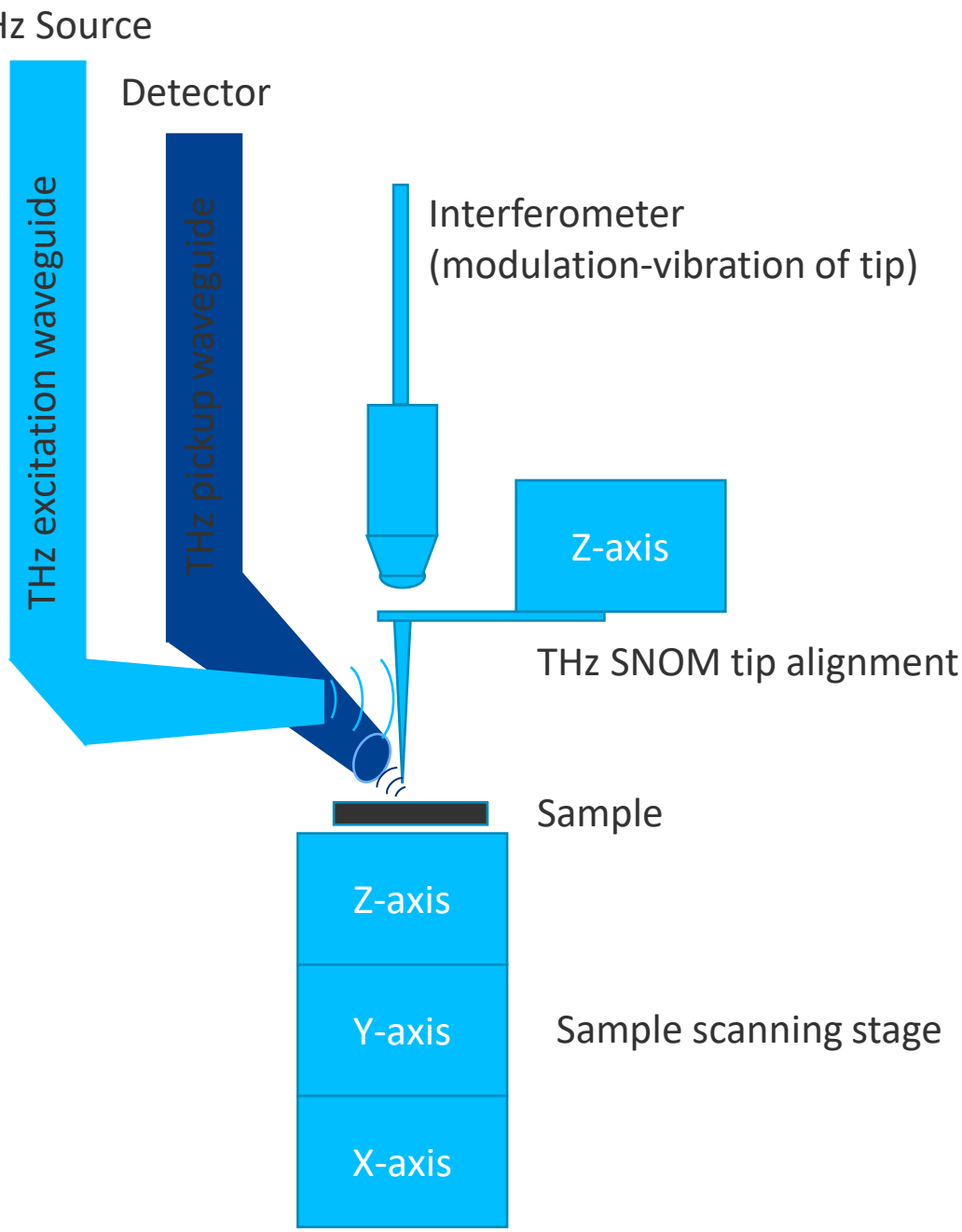






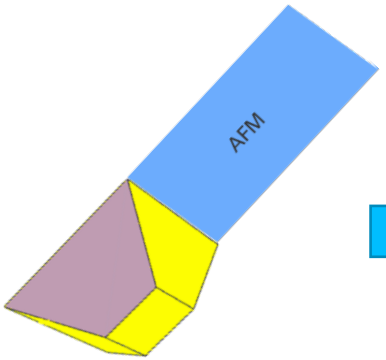
Opt. Eng. 52(3), 033203 (Mar 15, 2013). doi:10.1117/1.OE.52.3.033203

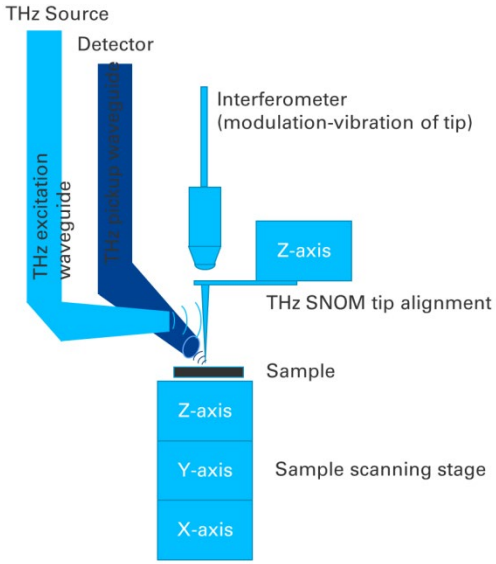
PETER schematic configuration

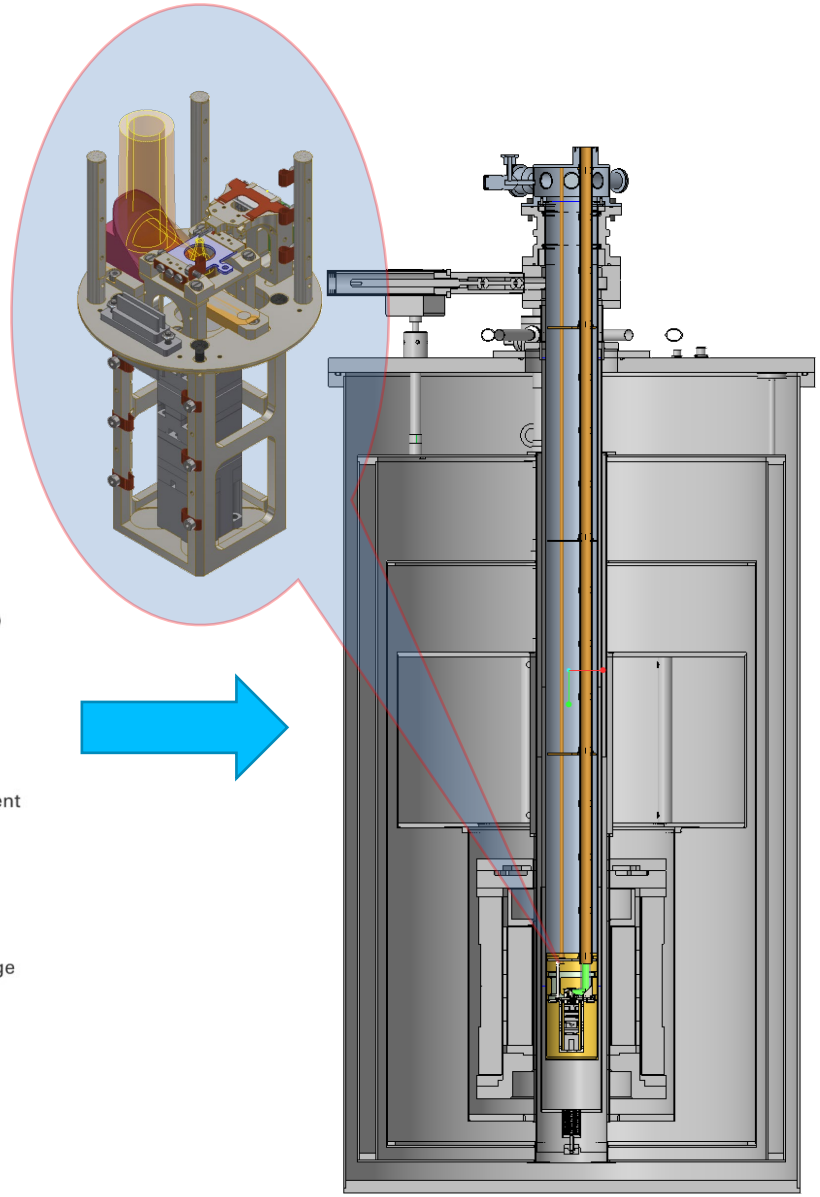


Cryostat (2-4 K) and high magnetic field (up to 14 T)

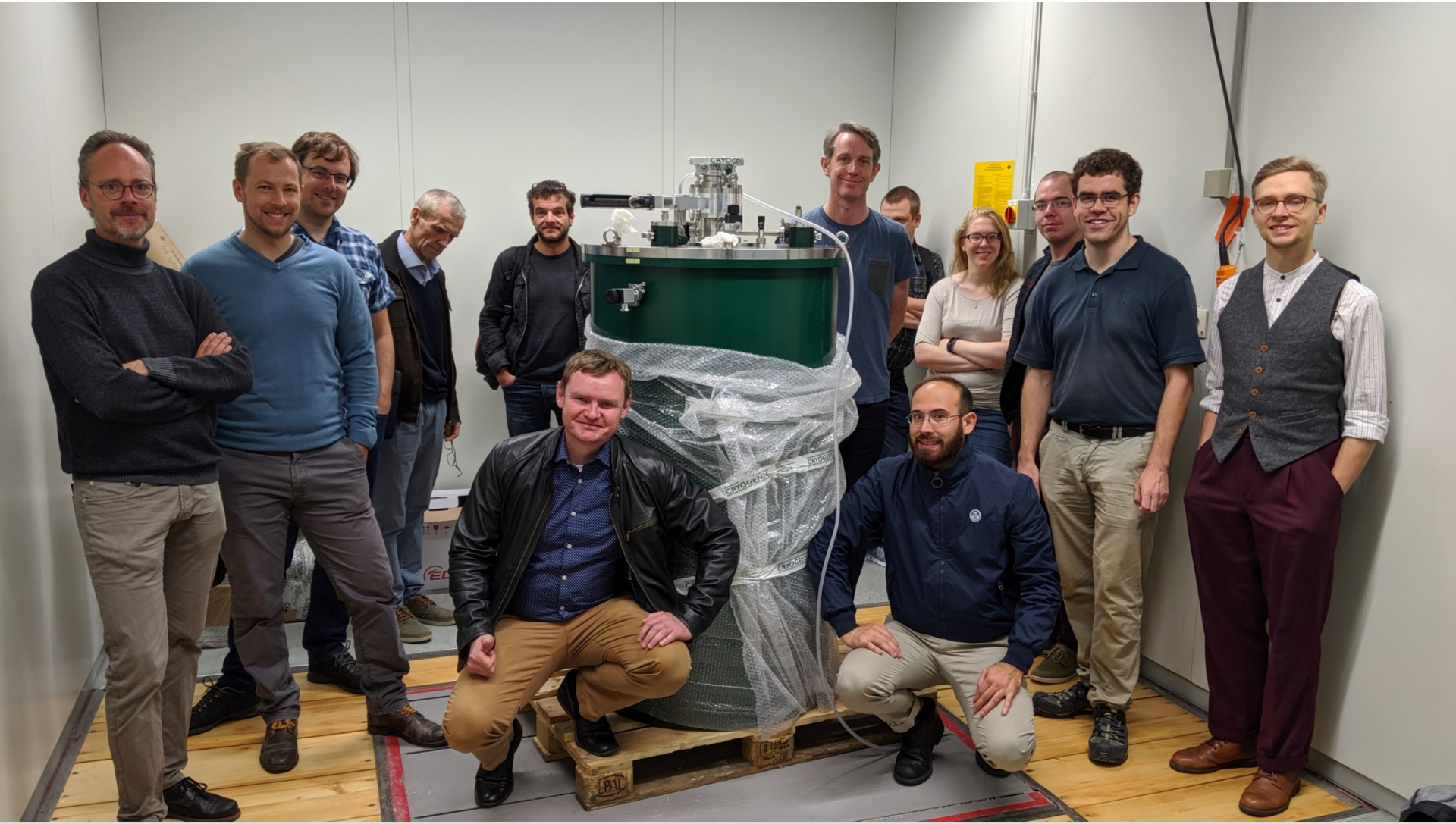
Progress so far



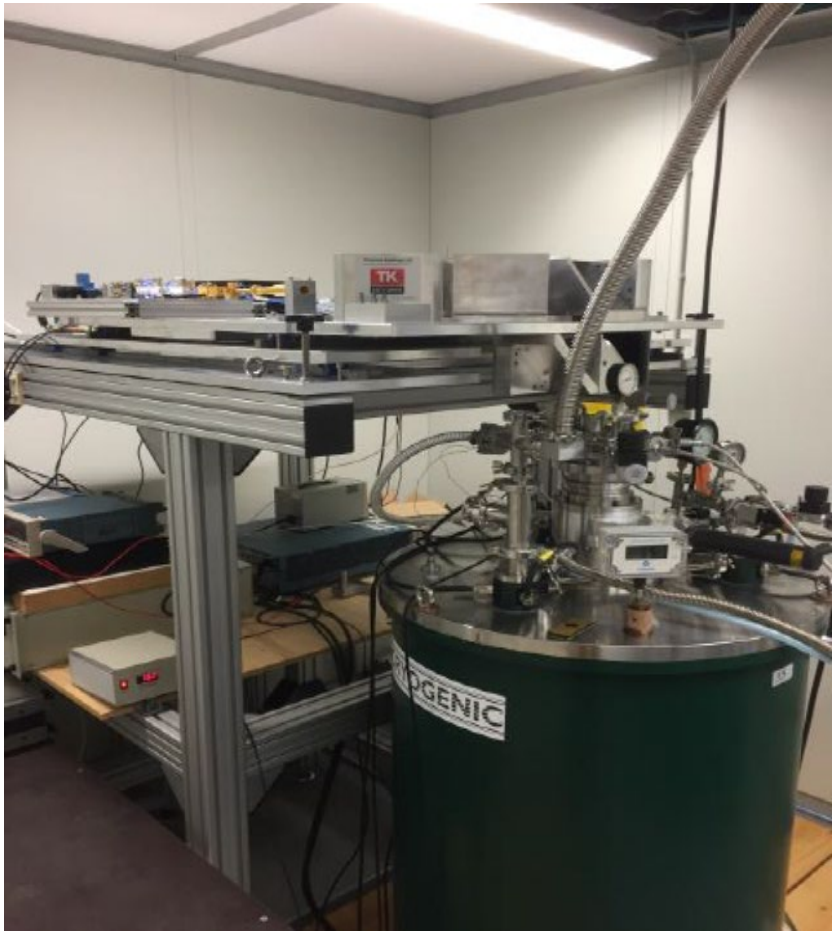


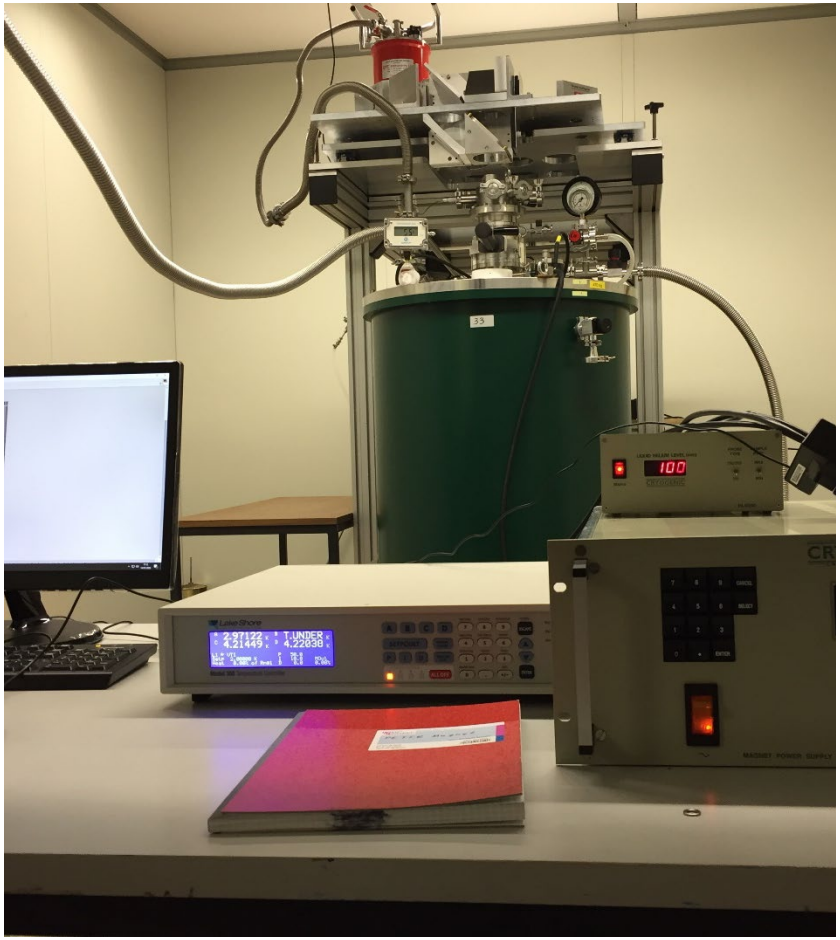


PETER team – installing the magnet in Stuttgart



PETER prototype





Consortium

Petr Neugebauer

Tomáš Šikola – coordinator

Joris van Slageren

Richard Wylde

Rainer Hillenbrand

Consortium

Božena Čechalová – project manager

Joris van Slageren

Tomáš Šikola – coordinator

Richard Wylde

Rainer Hillenbrand

Finances

Project

Partner	Personal Costs k€	Durable Eq.	Other Goods/ Services	Travel	Indirect costs	Total
NanoGune	340	60	60	30	123	613
USTUTT	268	300	65	15	162	810
TK	538	0	55	37	158	788
CEITEC BUT	278	115	124	33	138	688
Total						2900

Conclusions - recommendations

1. Do not let discourage yourself by the highly challenging programme criteria
2. Find an original, rather risky idea, discuss and analyse it with your partners in detail a sufficient time in advance (better in a few stages – time demanding process, half a year at least?)
3. The idea might be more easily found out of the "main stream" – for inspiration consult the list of successful projects from the previous calls
4. The idea should have a significant impact and outreach (not only within scientific community, but also on innovations, industry, society)
5. Kind of proof of concept (at least simulations)
6. Consortium should be properly composed (not all partners must be top players, including the coordinator) – complementary expertise and skills (company). Do not be afraid of taking the role of the coordinator (higher chance to get partners in). Less partners, the better for "steering" the team (average number: 5-6 partners)
7. Do not underestimate "soft" activities - dissemination
8. Take the same attention to all 3 project Sections (Excellence, Impact, Implementation) - loss of any point is fatal