

Widening participation and strengthening the European Research Area

Call - Excellence Hubs

Prof. Toms Torims
CBG Chairman



Conditions for the Call

HORIZON-WIDERA-2022-ACCESS-04-01

- ▶ Type of action: CSA - **Coordination and Support Actions**
- ▶ Budget in 2022 – 50M / 10 projects to be funded
- ▶ We can aim to **5M**
- ▶ The expected duration of the project is up to **4 years**

- ▶ It is about innovation excellence in the Baltic region
- ▶ CBG Members are eligible – institutional OK is needed
- ▶ Yet much wider partnership and partner engagement is required
- ▶ We will need support of BA and all the stakeholders. All.



This can be CBG
Flagship Project

Can we do that?

Expected Outcome – Big ones

- ▶ to strengthen **regional innovation** excellence in placed based innovation ecosystems – *meaning local*
- ▶ by **cross-border collaboration** on a **common strategy** and/or alongside value adding chains – *this is CBG exactly*
- ▶ Place based innovation ecosystems are **interconnected** companies, research institutions, governmental bodies and societal actors [Quadruple] – *this is within CERN framework + other partners*
- ▶ that are mutually reinforcing each other in a territorial context and together **raise the level of innovation excellence** in their regional fabric – *this is part of CBG objectives and Policy Actions*

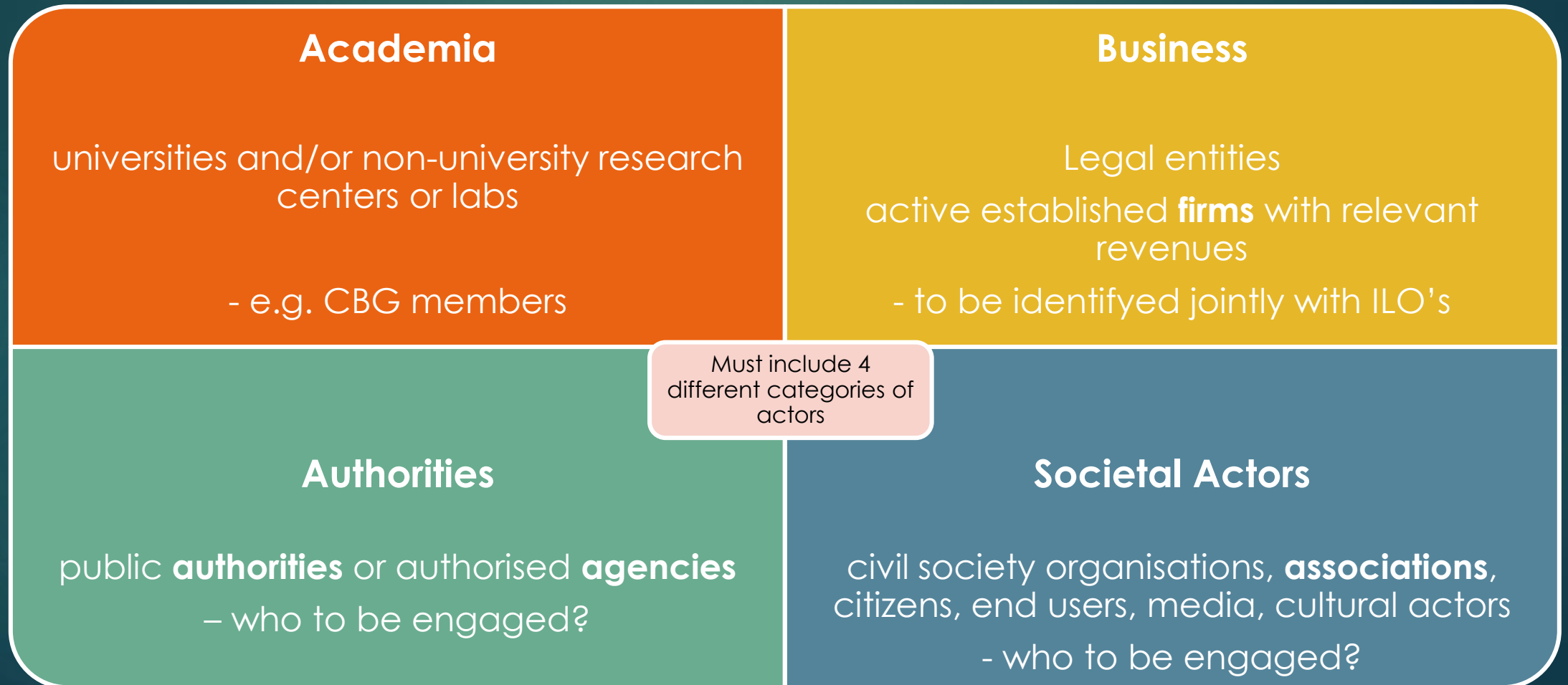
Expected outcomes (1)

- ▶ Excellent and **sustainable** place based **innovation ecosystems** ... and beyond in relevant domains of **cutting-edge science and innovation** – *in the CERN framework*
- ▶ Long term joint **R&I strategies** underpinned by **concrete action plans** of European relevance – *CBG Strategy based on national and other supernational strategies*
- ▶ Common **investment plans** for R&I **including infrastructures** leveraging **national, regional and European funds** as well as **private capital** in a synergetic manner – *there has to be link to another plans and projects + funding – e.g. Advanced Particle Therapy Center in Baltics and Compact Helium synchrotron*
- ▶ R&I **pilot projects** alongside a **joint strategy** and **in line with regional and national strategies**, notably regional innovation strategies for **smart specialisation** (RIS3) – *this we need to check*
- ▶ **New competencies** and **skills for researchers, entrepreneurs** and **professionals** in R&I intensive domains – *we shall go beyond the state of art*

Expected outcomes (2)

- ▶ Strengthened **linkages between science and business** – *Baltic ILOs and industry engagement*
- ▶ **Poles of attraction** for talents in catching up regions and countries – *yes, we can attract the best because of the network and possibilities at CERN and in the new PhD programme, mater programme to follow*
- ▶ Improved **knowledge transfer** and development of entrepreneurial skills – *CERN KT group, BIC in Lithuania, joint university projects with industry*
- ▶ **Uptake** of innovative technologies – *directly from the CERN – Particle Therapy (HITriplus, NIMMS etc), + Additive Manufacturing (I.FAST)*
- ▶ **New business** opportunities especially for SMEs and new employment – *brand new business sector in Baltics, new technology, first to have the access*

Potential Partners Quadruple



Place based R&I ecosystems Quadruple

- ▶ must include **at least two different** place based R&I ecosystems in at least two different countries
 - ▶ So, we shall go with 3 – one per country
 - ▶ What place based ecosystems we can propose?
 - ▶ In LV? In LT – CERN BIC? In EE?
- ▶ This quadruple helix approach needs to be presented in the proposal either by one or more **umbrella organisations** (e.g. clusters) or **representative individual entities** representing each of the four categories
 - ▶ Which are our umbrella organisations? In LV it is *CERN Latvia Stakeholders Group* – it is not a legal entity, yet all 4 segments are clearly represented
 - ▶ Radiologists, cancer treatment specialists, medical physicists alike
 - ▶ In EE? In LT?

Potential Partners

Quadruple Ecosystems and Actors (2)

- ▶ *Consortium can be wide, yet key players have to be clearly identified*
- ▶ **At least one** of the business entities needs to be an **established firm** (no start-up) with significant and proven operational income to be verifiable by balance sheets or business reports of at least two consecutive years – *so we need one established firm in the relevant field. However, SMEs are also shall be considered*
- ▶ *Interconnected research and innovation ecosystems **embedded in regions and cities.** Innovation happens in places and there are **specific local conditions that enable ecosystems** to flourish.*

Potential Partners

Quadruple Ecosystems and Actors (3)

Academia	Business firms	Authorities	Societal Actors
Riga Technical University (RTU) – LV	LV - ?	LV - ?	LV - ?
University of Latvia (UL) – LV	EE - ?	EE - ?	EE - ?
Tallinn University of Technology (TalTech) – EE	LT - ?	LT - ?	LT - ?
National Institute of Chemical Physics and Biophysics (NICPB) – EE		LT CERN BIC?	Associations?
Vilnius University (UV) – LT		LIAA?	
Riga Stradins University (RSU) – LV		Estonian Research Council?	
University of Tartu (UT) – EE		Municipalities?	
Kaunas University of Technology (KTU) – LT		Policy makers – meaning ministries	
Vytautas Magnus University (VMU) – LT			

Potential Partners

Quadruple Ecosystems and Actors (4)

- ▶ Individual participants and ecosystems from other EU member states, associated countries and **international co-operation partners** may join in **duly justified cases** e.g. given by a **specific expertise needed** or the involvement in a relevant value adding chain –
- ▶ *So clearly CERN can be the partner under Academia pillar*
- ▶ *Shall we kindly ask CERN to join-in?*

Scope of the Excellence Hubs

- EH

- ▶ are part of the European excellence initiative and **complement** the science oriented schemes Teaming, Twinning, ERA Chairs and the European excellence initiative for universities by a **dedicated innovation component**
- ▶ will focus on innovation by allowing innovation ecosystems in widening countries and beyond, **to team up** and create **better linkages** between academia, business, government and society – *also to engage already functional LV and EE CERN stakeholder groups*
- ▶ To foster a **real placed based innovation** culture in widening countries based on a **strategic agenda** aligned with regional or national **smart specialisation** strategies
- ▶ **synergies** will be sought with the programme parts on European Innovation Ecosystems and the European Institute of Innovation & Technology (EIT)

Scope: key words (1)

- ▶ to bridge the **innovation divide** – *Baltics are legging behind*
- ▶ **translating R&I results** into the economy – *uptake by Baltic business*
- ▶ support R&I policies aiming at boosting the **resilience and competitiveness** of [Baltic/EU] **economies and societies** – *our economies and societies are fragile and non-competitive?*
- ▶ Europe's competitive **leadership** in the global **race for technology** – *what we can offer technologically? Compact Helium synchrotron? New cancer treatment technology? New AM applications?*
- ▶ improving the **environment for business R&I investment** – *I am not sure that we can do this one – it is for policy makers, if they are on board, then maybe new strategies or show-case can come out of her?*
- ▶ deployment of **new technologies** – *moving up TRL levels?*
- ▶ enhancing the take up and visibility of research results in the economy and society as a whole

Scope: key words (2)

- ▶ to bridge the **innovation divide** – *from academia to business? From West to East?*
- ▶ translating R&I results **into the economy** – *knowledge transfer from CERN and HIT and CBG to industry*
- ▶ support **R&I policies** aiming at boosting the resilience and competitiveness of [Baltic/EU] economies and societies – *this again is policy matter, so for our partners from Authorities*
- ▶ Europe's competitive leadership in the **global race for technology** – *we can help EU to be more competitive*
- ▶ improving the **environment** for business R&I investment – *new excellence hub in Baltics*
- ▶ deployment of **new technologies** – *we shall concentrate on the novel technologies as proposed before*
- ▶ enhancing the **take up** and **visibility** of **research results** in the economy and society as a whole – bring our research results to society – *cancer treatment*

Scope: key words (3)

- ▶ **For regions** as R&I actors - they are the place where the innovation and industrial ecosystems breath and develop
- ▶ making the **links** between Europe and industry/SMEs, research centres, innovation stakeholders as well as citizens
- ▶ **Regionally developed** innovation ecosystems connected across Europe will be the driver of new European strategic **value chain** – *CBG Excellence Hub can be one for the Baltics*
- ▶ **EH are networks** of place based innovation ecosystems ... **involving larger communities of actors** in a regional context based on the quadruple helix principle – *as above. Does it mean that we may have many partners?*

Core components

- ▶ **Cross-border joint R&I strategy** aligned with regional smart specialisation strategies and/or European policy priorities such as the green and digital transition – *CBG strategy is needed and we are currently working on that*
- ▶ **R&I project** consolidating **academia business linkages** and providing evidence for strategy building and investment – *Advanced Particle Therapy, Compact Helium synchrotron, Additive Manufacturing technologies*
- ▶ Action and **investment plans** for implementation of the strategy – *business and government interest shall be checked*
- ▶ **Conceptual design** and **pre-planning for pilots** and demonstrators (if applicable) in line with the strategy – *this we can do for Compact Helium synchrotron*
- ▶ **Accompanying measures** e.g. to raise visibility, citizen engagement, technology transfer, entrepreneurship training, staff exchange, mutual learning etc – *all this is possible and feasible within CBG framework*

R&I strategies

- ▶ EH should improve **access to excellence** for R&I actors in widening countries and **elaborate joint R&I strategies** that are aligned with national, regional (notably RIS3) and/or European strategies or policy priorities (e.g. Green Deal, Digital transition) – *CBG Strategy + European Physics Strategy, Green Deal, Digital EU, Mission Cancer, etc.*
- ▶ These strategies [to be] **underpinned** by **concrete actions** plans and an **investment strategy** that reaches out **beyond the project's lifetime** and will leverage national, regional and European funds as well as private (venture) capital – *link to other projects and long term investments have to be proved – this will be challenging*
- ▶ Investment plans [may] include pertinent **R&I infrastructures** as well as **demonstrators** and **pilots** – *so it means that infrastructure, demonstrators and pilots should be financed from other sources?*

Research component (1)

- ▶ [to be] developed by **joint pilot research projects** in a domain covered by the joint strategy
- ▶ that will facilitate long term cross border and inter-sectoral collaborative links between partners notably academia and business and advancement in science and technology development with market potential – *again, any of these Advanced Particle Therapy, AM technologies*
- ▶ **R&I projects** should serve the purpose **to close knowledge gaps** and develop **evidence** to underpin the development of the **strategy and the investment plans** – *it means theoretical R&I projects? Strategies and investment plans are difficult to consider as research...*
- ▶ E.g. **lab prototypes** [might] be developed **leading to** the design of pilot plants or demonstrators – *lab prototypes are eligible – so TRL 2- TRL3*

Research component (2)

- ▶ the realisation of such **pilots and demonstrators must be financed by other sources** in particular programmes co-financed by the ERDF. - *it means that infrastructure, demonstrators and pilots should be financed from other sources...*
- ▶ The **approach how to access such co-funding** at a later stage should be sketched out in the proposal – *can be done*
- ▶ Notably for the case of ERDF the proposal should demonstrate the alignment with the pertinent regional smart specialisation – *can be done – there is a link*
- ▶ So here **we can do** R&I projects with **lab prototypes** at TRL 2- TRL3 which could be base for further pilots and demonstrators – financed from other sources

Accompanying measures are complementary activities



[to] promote knowledge and technology transfer, mutual learning and skills development especially in research and innovation management and entrepreneurship as well as citizen engagement



Mutual secondments and staff exchange within and between ecosystems will help to build trust and long term collaborative links.

Collaborative links

- ▶ [to] outline the nexus of **collaborative links** and if applicable competitive relations of commercial actors within each of the ecosystems in a **conceptual model** – *this model to be created*
- ▶ Ecosystems or **individual partners** from outside the widening countries may participate in the consortium as long as they **prove added value by facilitating access to excellence** for the widening countries – *if we would like to go ahead with Advanced Particle Therapy we will be needing HIT as a partner... CERN can be a mediator between – we are working with them already in HITRIplus and NIMMS*
- ▶ <https://www.heidelberg-university-hospital.com/diseases-treatments/cancer-and-tumor-diseases/proton-therapy-and-carbon-ion-therapy>

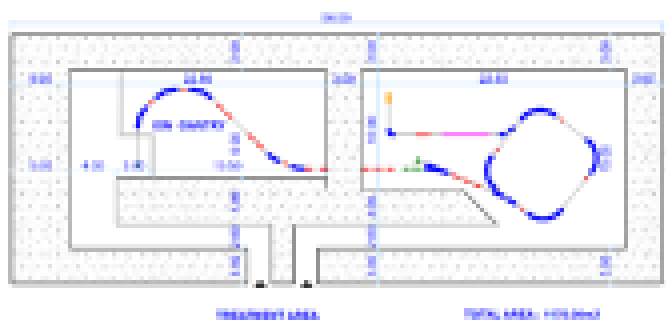
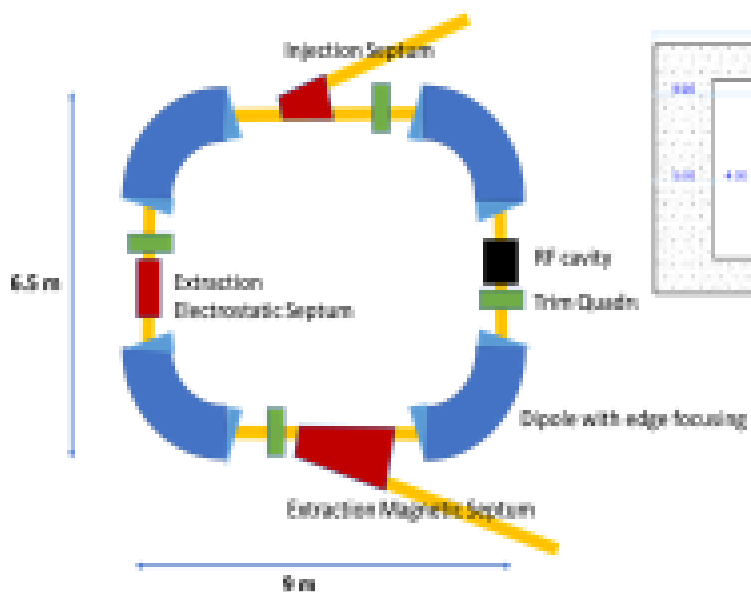
Ecosystems and scientific domain

- ▶ [to] convincingly demonstrate the relevance of the **chosen scientific domain** by its alignment with regional (in particular RIS3), national and/or European R&I strategies and policy priorities – *to check how it goes together with high energy physics and accelerator technology!*
- ▶ [may] choose between a more **regional orientation** e.g. proven by a common denominator in their regional smart specialisation strategy and/or a **more global** orientation towards European policy priorities such as the green or digital transition – *we shall go big*

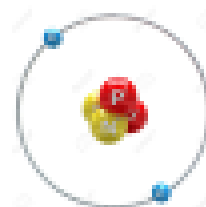
Long-term vision beyond the state of the art

- ▶ **R&I content** description should include a **long-term vision** beyond the state of the art of the chosen R&I domain – *Advanced Particle Therapy – e.g. Compact Helium synchrotron technology development R&I project with several lab prototypes in Baltics*
- ▶ *Encompassing expertise of the each of CBG partners + chosen industry partners*
- ▶ [to] demonstrate the **win-win effects** of the partnership established by the consortium and the **benefits for employment and post crisis recovery** – *this is matter of writing – clear case is here*
- ▶ **EH is a new action** – different from others with its strategic orientation, broader scope – *perfect fit for CBG*

3. Compact Helium synchrotron



A single-room facility with compact He synchrotron and superconducting gantry



Advantages:

- Simple and compact, known technologies
- Synchrotron based on standard components
- Can use SIGRUM gantry

Disadvantages:

- Cannot exploit the full potential of ions
- Requires some limited R&D for the magnets

NIMMS/HITRI+ has just started the design of a compact Helium synchrotron
(E. Benedetto, SEEIIST/TERA/CERN)

- Use of ^3He with higher field in magnets allows keeping similar dimensions as proton synchrotrons
- With ^4He the dimensions are 20% larger

Helium gives better precision than protons and could treat some radioresistant tumours at much lower cost than carbon – wide interest in medical physics community. Tests starting at HIT centre.

Limited R&D required (2T magnets)

Can use the SIGRUM gantry at a lower field (safer)

Could use a dual-mode injector for radioisotopes and accelerate carbon for a penetration of 11 cm (^4He)

Implementation

- ▶ Proposals should present a coherent **package of actions** well proportioned in terms of:
 - ▶ Strategy development
 - ▶ Research
 - ▶ Innovation
 - ▶ Outreach activities
- ▶ *These are our potential WP's*
- ▶ *+ of course Management WP, Ethics WP etc...*

Potential Outcomes

- ▶ Cross-border joint R&I **Strategy**
- ▶ Action and **investment plans** for implementation of the strategy
- ▶ **R&I project:**
 - ▶ **Conceptual design** [of Compact Helium synchrotron?] and **pre-planning** for pilots and demonstrators in line with the strategy
 - ▶ **Lab prototypes** - selected challenging components of above
- ▶ **Accompanying measures** [outreach]- raise visibility, citizen engagement, technology transfer, entrepreneurship training, staff exchange, mutual learning etc

To clarify

- ▶ How big is *research component* part?
- ▶ Do we have here money also for hardware? Or soft actions only?
- ▶ Infrastructure, demonstrators and pilots should be financed from other sources?
- ▶ Shall we engage CERN as a partner?
- ▶ *ex aequo* proposals will be prioritised according to geographical diversity criteria – what is that?
- ▶ Other academia partners from Baltics? Medical university in LT?



We can build on the
success of CBG ...

We need to decide
on direction!