EDM next steps
for discussion!

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Summary

- Physics case well made
- Support from the physics community
- Examined detail for over a decade
  - BNL srEDM, IPK…
  - CPEDM from 2016
- ESPP update 2018 – 2020
  - proposal well received and cited in deliberation document
  - high-level support is apparent
- “Feasibility” study published
- Encouraging response to AdG application

ESPP: Other essential scientific activities for particle physics

- The quest for dark matter and the exploration of flavour and fundamental symmetries are crucial components of the search for new physics. This search can be done in many ways, for example through precision measurements of flavour physics and **electric or magnetic dipole moments**, and searches for axions, dark sector candidates and feebly interacting particles.
- There are many options to address such physics topics including energy-frontier colliders, accelerator and non-accelerator experiments.
- A diverse programme that is complementary to the energy frontier is an essential part of the European particle physics Strategy.
- *Experiments in such diverse areas that offer potential high-impact particle physics programmes at laboratories in Europe should be supported, as well as participation in such experiments in other regions of the world.*

CERN Medium Term Plan 2020

- A diverse scientific programme is strongly supported by the 2020 Strategy update, which also recognised the role of the **Physics Beyond Colliders** (PBC) study group as the focal point for promoting and channelling new research initiatives on non-collider physics at CERN and European national laboratories….
- **Support is and will continue to be provided also to projects at European national laboratories, such as the BabyIAXO axion search experiment at DESY and a prototype storage ring for proton electric dipole moment studies at the Jülich research centre in Germany.**
- Given the importance of a diverse scientific programme to addressing the outstanding questions in particle physics in a way complementary to high-energy colliders, PBC activities are funded with an increased budget of 3 MCHF/year in this MTP (up from 1 MCHF/year).

Comments

- Competitive landscape
- Systematic errors are a serious challenge

Overall

- Clear agreement on overall strategy
  - Precursor
  - Prototype (2 stages: E, E+B)
  - Full-scale ring
- Motivation for the prototype ring well developed
  - Study open issues
  - First direct proton EDM measurement

Frank's list

	Already addressed	Strong support required	CERN
PTR Lattice design		SS	SP
Beam transfer and injection system		S/C	SP
Electrostatic deflectors	Y	S/C	C
Magnetic bends	Y	S/C	SP
Multipole elements		SS	C
Ring vacuum system		SS	C
Stochastic cooling	Y	S/C	
RF Cavities		SS	C
Spin manipulation tools	Y	S/C	
Polarimeter		SS	
Beam diagnostics	Y	S/C	SP
Studies (systematics…)		S/C	SP

Plus, of course, potential contributions of other institutes

Towards PTR

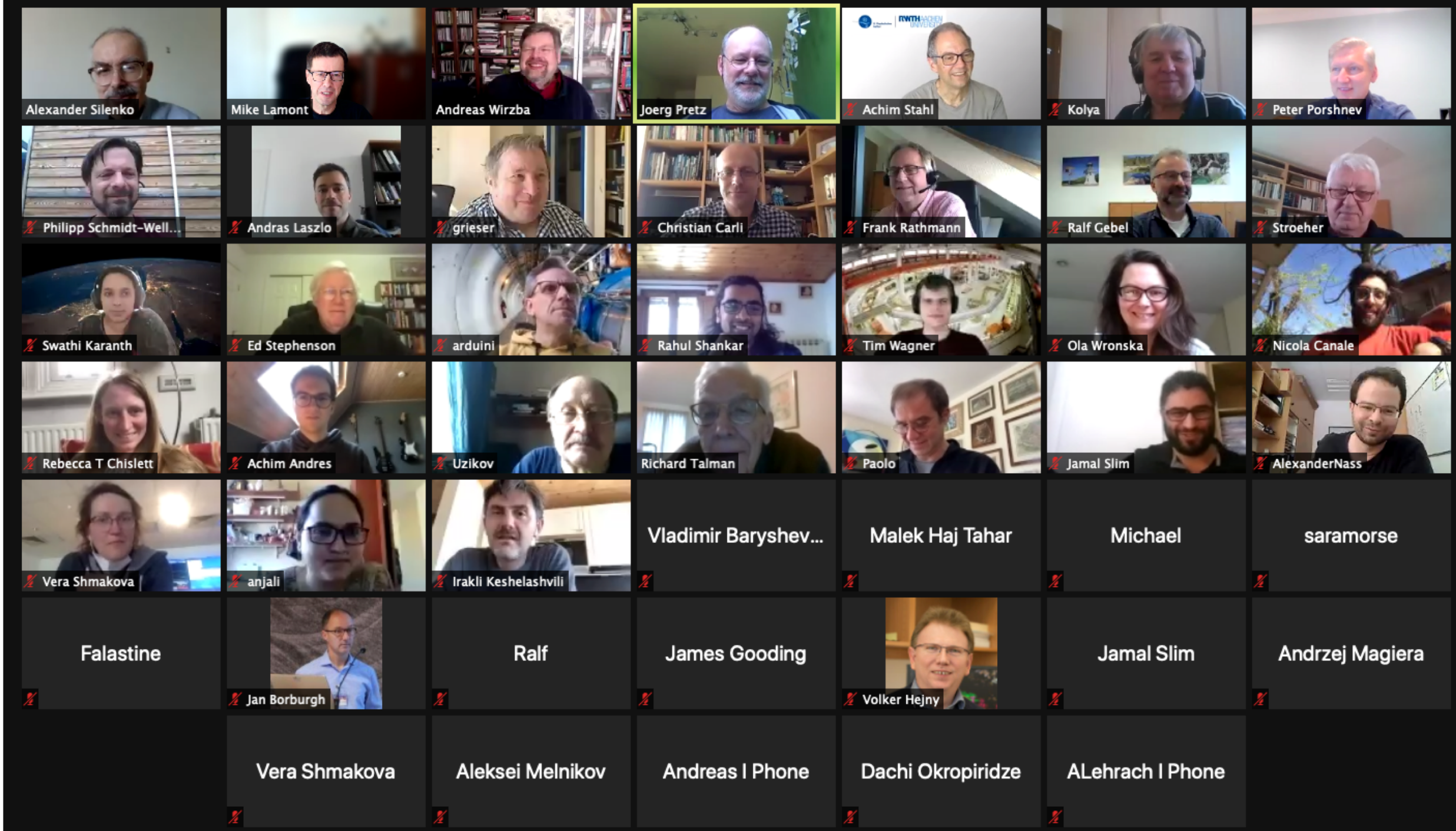
- Pieces are there
  - including convincing precursor measurements (to be published!)
- Need some scrutiny and rationalization
  - resolve “fundamental questions” (lattice, machine layout, injection scheme…)
- Concise PTR “CDR” with agreed baseline ring design, lattice, hardware specs. etc.
- Roadmap to TDR including prototyping etc.

Project organization

- Project structure required
  - loose affiliations are not enough (in fact make it tougher…)
  - Establish project structure, resources, roadmap
- Project leader with resources and time to coordinate across a work package breakdown (WP leader, resources, timeline, deliverables…)
- EU programme options to be revisited

Project ownership

- Need political support and high-level buy-in
- Need clear statement of support in DE
- Need to agree on possible site
- CERN can not take the lead
  - But is prepared to provide support – see MTP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