

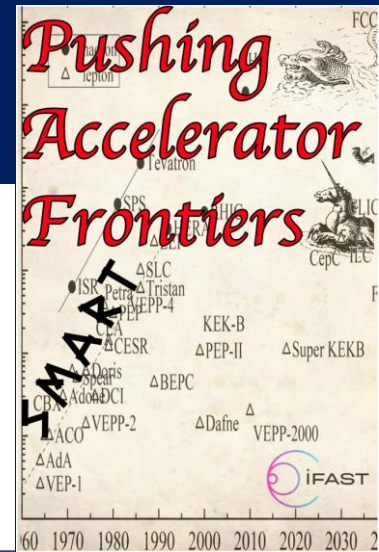
Welcome - SRGWmb2025

Frank Zimmermann, SRGWmb2025

10 February 2025



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what is iFAST WP5?



WP5: Strategies and Milestones for Accelerator Research and Technologies (SMART)

Peter Forck (GSI), Giuliano Franchetti (GSI), Nadia Pastrone (INFN),
Frank Zimmermann (CERN)



Participating Institutes:

INFN, CERN, CEA, CNRS, KIT, PSI, United Kingdom Research and Innovation, GSI, Bergoz Instrumentation, Barthel HF-Technik GmbH, HIT Heidelberg + JGU Mainz



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the three SMART pillars



Task 5.1 MUon colliders Strategy network (MUST)

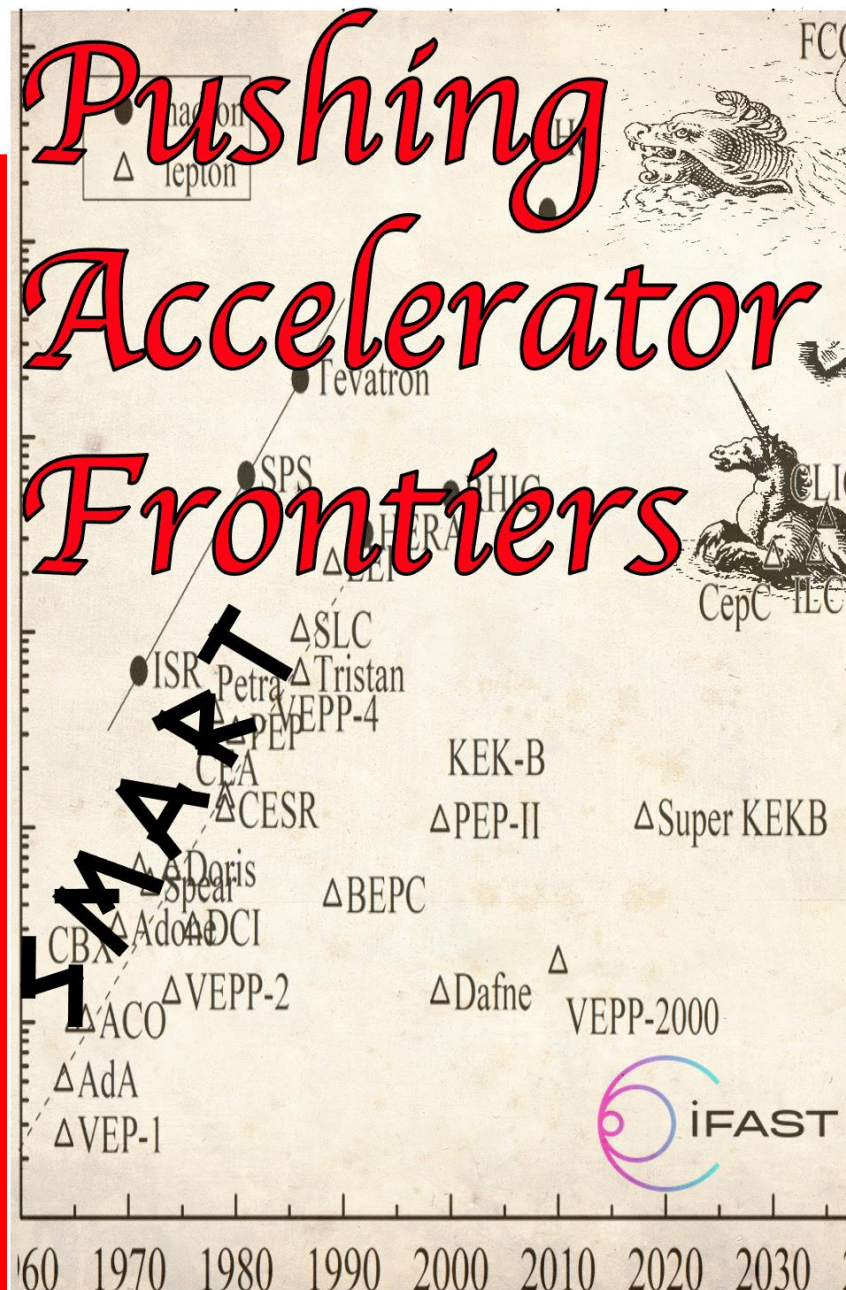
Coord.: Nadia Pastrone (INFN)

INFN, CERN, CEA, CNRS, KIT, PSI, UKRI

Support the effort to design a muon collider and to project and plan the required R&D.

Consolidate the community devoted to developing an international future facility.

Prepare the platform to disseminate the information



Task 5.3 Improvement of Resonant slow EXtraction spill quality (REX)

Coord.: Peter Forck (GSI)

GSI, BI, BT, CERN, HIT

Mitigate intensity fluctuations of slowly extracted beam from synchrotrons by means of detailed parameter simulations, related experimental verifications, and active beam control

Produce a prototype of improved hardware for power supply control to achieve a current stability in the range of $\Delta I / I < 10^{-6}$.

Design and produce a high-performance RF-amplifier with versatile control for knock-out extraction.

WP 5.2 Pushing Accelerator Frontiers (PAF)

- **Main tools:** **topical workshops and dedicated prospective studies**
- **Overriding goal:** survey **accelerator frontiers and develop long-term strategies** for boosting the performance of **future facilities** and for **overcoming limitations**; develop a **coherent landscape for future accelerators and issue targeted R&D recommendations**
- **Thrust 1:** networking on **novel intense positron sources**, providing a “**condensation point**” for the **worldwide positron-source community** (CNRS – Iryna Chaikovska)
 - different methods of e^+ production, both classical techniques & especially novel/exotic ones
- **Thrust 2:** **survey extreme beams and ultimate limits**, and examine **approaches to overcome the present limits on beam brightness** (CERN – Frank Zimmermann, GSI – Giuliano Franchetti)
 - **space-charge compensation or cooling, crystalline beams,..** - ultimate limits on **high-gradient acceleration, high-field bending, beam size, beam density, and luminosity**
- **Thrust 3:** **artificial intelligence for accelerators**, applications of **machine learning, deep learning, advanced optimization algorithms and neural networks**, for accelerator control & design (PSI – Rasmus Ischebeck)
- **Thrust 4:** **accelerators for “dark sector” & precis. physics** (CERN – Christian Carli, GSI – Bernd Lorentz)
 - accelerator/beam requirements for dark-sector searches in fixed-target experiments; investigating current precision frontier accelerator developments, such as EDM ring designs
- **Thrust 5:** **green accelerators, sustainable accelerator concepts, e.g. energy recovery, energy efficiency, and possibly particle (e.g. positron) recycling** (CERN, GSI, CNRS, PSI, + JGU – Florian Hug)

participants

Adrian Oeftiger	University of Oxford
Akira Miyazaki	CNRS/IN2P3/IJCLab
Alex Kehagias	NTUA (remote?)
Frank Zimmermann	CERN
Giuliano Franchetti	GSI
Igor Fomin	Bauman Moscow State Technical University (remote)
Innocenzo Pinto	LVK (remote)
Jason Aebischer	CERN
Jonathan R. Ellis	King's College London
Katsunobu Oide	UNIGE
Markus Wellenzohn	University of Applied Sciences Vienna (remote)
Sebastian Ellis	University of Geneva
Stefania Petracca	INFN, University of Sannio
Surjeet Rajendran	Johns Hopkins
Thorben Schmirander	University of Hamburg
Valerie Domcke	CERN

draft agenda

Monday

09:00 - 09:15 **Welcome** *Frank Zimmermann*

09:15 - 09:45 **Status of the waves: summary of the first workshop** *Frank Zimmermann*

09:45 - 10:15 **Update on the atomic interferometer: status, plans, and timelines** *Jonathan R. Ellis*

10:15 - 11:00 **Coffee Break**

11:00 - 11:30 **Storage rings to search for signals of dark matter/dark energy** *Surjeet Rajendran*

11:30 - 12:00 **Review and status of the dynamics in Cyclotron with GW** *Giuliano Franchetti*

12:00 - 14:00 **Lunch**

14:00 - 14:30 **Optics for gravitational ring detectors** *Katsunobu Oide*

14:30 - 15:00 **GW detection with Storage Ring** *Thorben Schmirander*

15:00 - 15:30 **Potential influence from stochastic GW on Spring-8 and other storage rings** *Akira Miyazaki*

15:30 - 16:00 **Coffee Break**

16:00 - 17:00 **Discussion**

Tuesday

09:00 - 09:30 **Future GW observations: spectral coverage, old/new directions, critical technologies** *Innocenzo Pinto*

09:30 - 10:00 **Electromagnetic detection of gravitational waves: A Review** *Valerie Domcke*

10:00 - 10:30 **Cosmological and astrophysical models for GW sources** *Alexandros Kehagias*

10:00 - 11:00 **Coffee Break**

11:00 - 11:30 **Using storage rings to look for new spin-dependent forces** *Surjeet Rajendran*

11:30 - 12:00 **SRF for GW detectors: the MAGO studies** *Sebastian Ellis*

12:00 - 14:00 **Lunch**

14:00 - 14:30 **Gravitational waves induced by electromagnetic radiation** *Igor Fomin*

14:30 - 15:30 **Concepts and ideas for accelerator-based GW detection: review and limits**

15:30 - 16:00 **Coffee Break**

16:00 - 17:00 **Discussion**

workshop dinner

18:45 meeting at CERN (in front of R1 ?)

19:00 at Luigia Academy in Vernier

Rte du Nant-d'Avril 148, 1217 Meyrin, Switzerland

small, but excellent group – 5 persons so far