

RF6 - Experiments and Facilities

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Resources

- experiments and facilities (this session)
 - Overleaf - <https://www.overleaf.com/4135382448wfbfbfqbqbcjzz>
 - archived copy of version circulated on Slack - <https://cernbox.cern.ch/index.php/s/flU4yVs33zD3v5O>
- big idea 1
 - <https://cernbox.cern.ch/index.php/s/bBRTV6KyIMj6bJI>
- big idea 2
 - <https://cernbox.cern.ch/index.php/s/XYqBShiYkbSQOvl>
- big idea 3
 - <https://cernbox.cern.ch/index.php/s/TZubRd3tiN5QFpV>

Document Overview

Thank you to all the folks who have contributed to the white paper!

If you have contributed but did not put your name on the author list, please do.

If you would still like to add input, let us know.

If you have any comments on our edits, please reach out

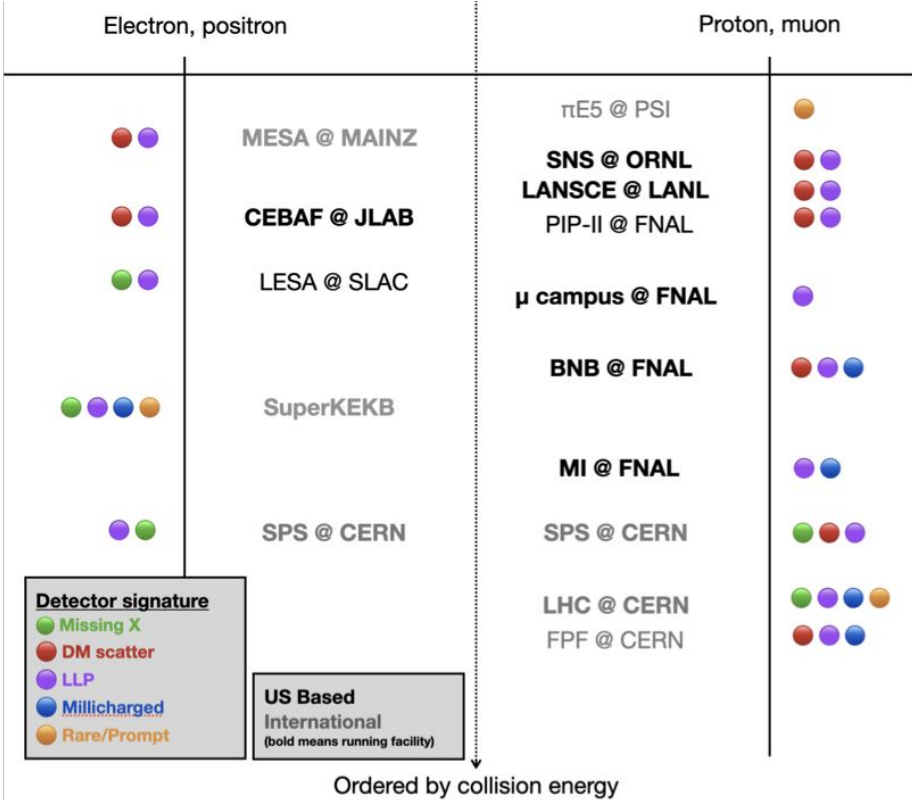
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Document overview

Table 1. Summary of experimental initiatives, facilities, and key features. **To discuss: how to include connection to physics drivers.**

Experiment	Facility	Beam Config	Beam Energy	Det Signature	Physics Driver Priorities			Timeline	Refs.
					DM	Visible	Flavor		
US-based									
HPS	CEBAF @ JLab	electron FT	1-6 GeV	LLP	-	-	-	running	section 3.15, [13]
COHERENT	SNS @ ORNL	proton FT	1 GeV	DM Scatter	-	-	-	running	section 4.5, [14]
CCM	LANSE @ LANL	proton FT	0.8 GeV	DM Scatter	-	-	-	running	[15]
SpinQuest/DarkQuest	MI @ FNAL	proton FT	120 GeV	LLP	-	-	-	construction, proposed upgrade	section 3.5, [16]
LDMX	LESA @ SLAC	electron FT	4-8 GeV	Missing X	-	-	-	R&D funding, 2024	section 3.17, [17]
BDX	CEBAF @ JLab	electron BD	11 GeV	DM Scatter, Millicharged	-	-	-	proposed	section 3.1, [18]
JPOS	CEBAF @ JLab	positron FT	11 GeV	Missing X	-	-	-	proposed	section 3.16, [19]
PIP-II BD	PIP-II @ FNAL	proton FT	1 GeV	DM Scatter, LLP	-	-	-	proposed (2029)	section 3.23, [20]
SBN-BD	Booster @ FNAL	proton BD	8 GeV	DM Scatter	-	-	-	proposed (2029)	[21]
REDTOP	TBD	proton FT	1-5 GeV	Missing X, LLP, Prompt	-	-	-	proposed	section 3.25, [22]
M ³	MI @ FNAL	muon FT	15 GeV muons	Missing X	-	-	-	proposed	[23]
FNAL- μ	muon campus @ FNAL	muon FT	3 GeV	LLP	-	-	-	proposed	section 3.13, [24]
International									
Belle-II	SuperKEKB @ KEK	e+e- collider	150 MeV	Missing X, LLP, Prompt	-	-	-	running	section 3.2, [25]
CODEX- β	LHC @ CERN	pp collider	6.5-7 TeV	LLP	-	-	-	construction (2023)	section 3.4, [26]
CODEX-b	LHC @ CERN	pp collider	6.5-7 TeV	LLP	-	-	-	proposed (2026)	section 3.3, [27]
LHCb	LHC @ CERN	pp collider	6.5-7 TeV	LLP, Prompt	-	-	-	running, future upgrade planned	section 3.18, [28]
NA62	SPS-H4 @ CERN	proton BD	400 GeV	LLP	-	-	-	dedicated running planned	[29]
FASERnu	LHC @ CERN	pp collider	6.5-7 TeV	DM Scatter	-	-	-	running	section 3.9, [30]
milliQAN	LHC @ CERN	pp collider	6.5-7 TeV	Millicharged	-	-	-	running	section 3.19, [31]
DarkMESA	MESA @ Mainz	Electron FT	150 MeV	DM Scatter, LLP	-	-	-	construction (2023)	section 3.6
NA64-e	SPS-M2 @ CERN	electron FT	100-150 GeV	Missing X, Prompt	-	-	-	running	section 3.20, [32]
NA64- μ	SPS-H4 @ CERN	muon FT	100-160 GeV	Missing X	-	-	-	commissioning	section 3.21
NA64/POKER	SPS-M2 @ CERN	positron FT	100 GeV	Missing X	-	-	-	planned (2024)	section 3.24, [32]
PIONEER	π E5 @ PSI	proton FT	10-20 MeV pions	Prompt	-	-	-	planned (2028)	section 3.22, [33]
FASER2	FPF @ CERN	pp collider	6.5-7 TeV	LLP	-	-	-	proposed (2029)	section 3.8 [34]
FORMOSA	FPF @ CERN	pp collider	6.5-7 TeV	Millicharged	-	-	-	proposed (2029)	section 3.14, [35]
FASERnu2	FPF @ CERN	pp collider	6.5-7 TeV	DM Scatter	-	-	-	proposed (2029)	section 3.10, [30]
FLAxE	FPF @ CERN	pp collider	6.5-7 TeV	DM Scatter	-	-	-	proposed (2029)	section 3.12, [36]
SND@LHC	LHC @ CERN	pp collider	6.5-7 TeV	DM Scatter	-	-	-	running	section 3.27, [37]
Advanced SND@LHC	FPF	pp collider	6.5-7 TeV	DM Scatter	-	-	-	proposed (2029)	section 3.27, [37]

Document overview



Points for Discussion

Much of the challenge with our white paper content was how to succinctly summarize all of the information you have sent to us.

- By definition it is a lossy compression task!

We can basically stare at the last two slides and talk about:

- What's missing?
- What's wrong?
- What we would like to change

More Specific Points for Discussion

- How do we want to recognize international vs US based (for example, FPF is international, but experiments require US funding)?
- Do we want to order the experimental signatures? Does this matter?
- Is “rare prompt” really the best category name? Any better suggestions?
- Do we want to change formatting on figure 1?
- How do we include physics drivers in the table? Is there information that we should include there that is missing?
- Are there additional points that people would like to make in the executive summary?
- By construction we have no conclusion. Do people feel strongly about this?