Snowmass Goals and Organization

- Opportunity for the entire particle physics community to come together to identify and document a scientific vision for the future of particle physics in the U.S. and its international partners
- https://www.snowmass21.org
- Provides input to the P5 (Particle Physics Project Prioritization Panel) which develops a strategy for the US HEP Program
- Organized in 10 "Frontiers"

::Snowmass Frontiers

- ENERGY FRONTIER
- NEUTRINO PHYSICS FRONTIER
- RARE PROCESSES AND PRECISION
- COSMIC FRONTIER
- THEORY FRONTIER
- ACCELERATOR SCIENCE/TECHNOLOGY
- INSTRUMENTATION FRONTIER
- COMPUTATIONAL FRONTIER
- UNDERGROUND FACILITIES
- COMMUNITY INVOLVEMENT

Accelerator Frontier - AF

- **Co-Conveners**

  Steve Gourlay (LBNL)

  Tor Raubenheimer (SLAC)

  Vladimir Shiltsev (FNAL)

<u>Topical groups</u>:

- AF1: Beam Physics and Accelerator Education
- AF2: Accelerators for Neutrinos
- AF3: Accelerators for EW/Higgs
- AF4: Multi-TeV Colliders
- AF5: Accelerators for PBC and Rare Proc.
- AF6: Advanced Accelerator Concepts
- AF7: Accelerator Technology (RF, magnets, sources/targets)

AF7: Accelerator Technology – Subgroup Magnets

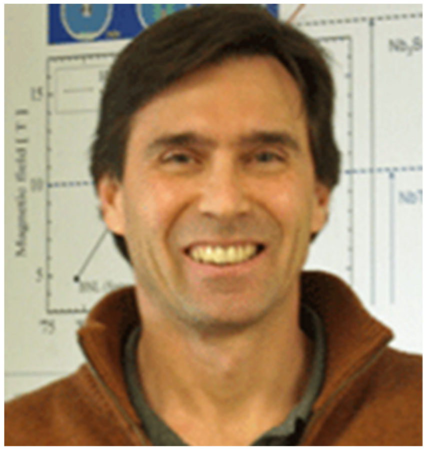
Goal

Address the potential contributions of magnet technology to future HEP facilities, the R&D required to enable these opportunities, the time and cost scales of these efforts, and the needs for associated fabrication infrastructure and test facilities.

Conveners

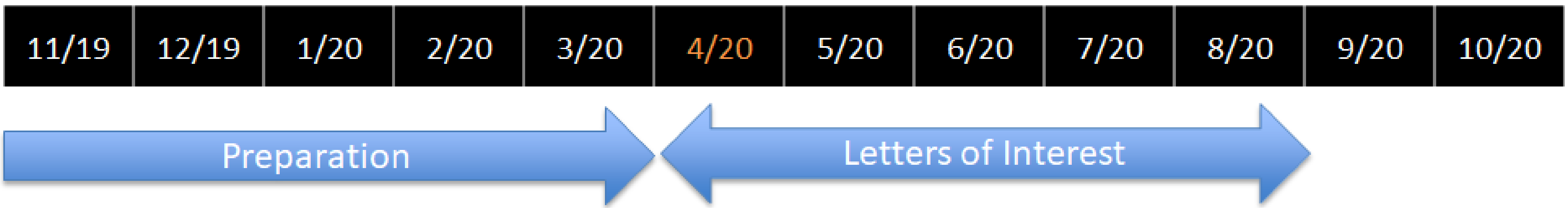
Susana Izquierdo Bermudez
CERN

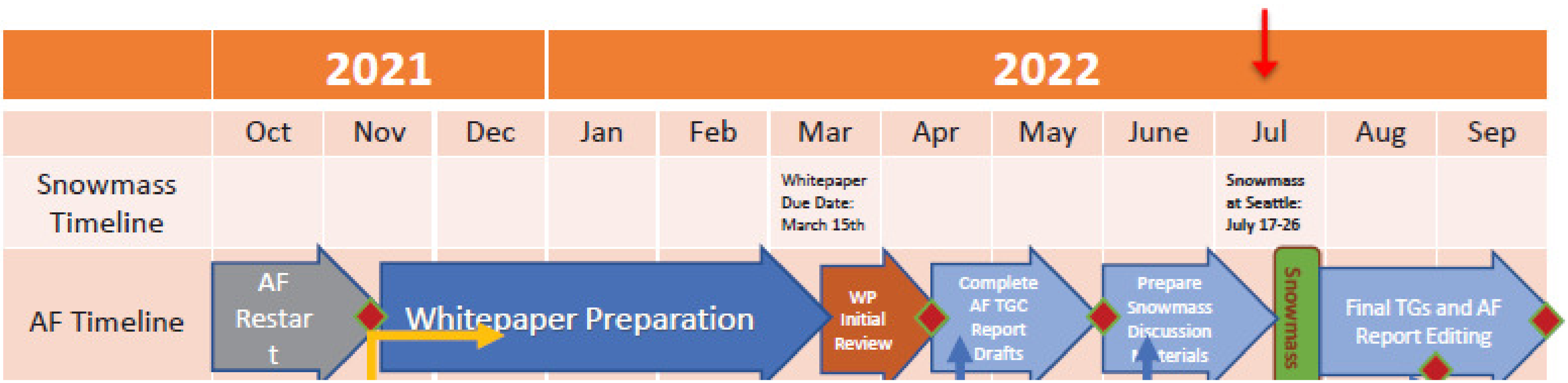
GianLuca Sabbi
LBNL



Alexander Zlobin
FNAL

Main steps and Timeline





AF7-Magnet Letters of Interest

Group 1: Regional plans (8 LoI)	
AF/SNOWMASS21-AF4_AF7_Kathleen_M_Amm-167.pdf	Kathleen Amm
AF/SNOWMASS21-AF4_AF7_Prestemon-187.pdf	Soren Prestemon
AF/SNOWMASS21-AF4_AF7_xuqj@ihep.ac.cn-022.pdf	Qingjin Xu
AF/SNOWMASS21-AF7_AF0_Luca_Bottura-249.pdf	Bottura
AF/SNOWMASS21-AF7_AF4-054.pdf	Apolinari
_SNOWMASS21-AF0_AF0_toru.ogitsu@kek.jp-019.pdf	Toru Ogitsu
AF/SNOWMASS21-AF1_AF7_GBisoffi-LRossi-100.pdf	Rossi
AF/SNOWMASS21-AF1_AF7_M.Seidel-118.pdf	Seidel
Group 2: Conductor (16 LoI)	
AF/SNOWMASS21-AF7_AF0_Fumitake_Kametani-067.pdf	Kametani
AF/SNOWMASS21-AF7_AF0-125.pdf	Ferracin
AF/SNOWMASS21-AF7_AF0-130.pdf	Kikuchi
AF/SNOWMASS21-AF7_AF0-217.pdf	Sumption
AF/SNOWMASS21-AF7_AF0_Cheggour-232.pdf	Cheggour
AF/SNOWMASS21-AF7_AF0_Sumption-Cable-089.pdf	Sumption
AF/SNOWMASS21-AF7_AF0_Tarantini-214.pdf	Tarantini
AF/SNOWMASS21-AF7_AF0_Tiziana_Spina-207.pdf	Spina
AF/SNOWMASS21-AF7_AF0_Venkat_Selvamanickam-	Selvamanickam
AF/SNOWMASS21-AF7_AF0_Vladimir_Matias-251.pdf	Matias
AF/SNOWMASS21-AF7_AF0_sumption-077.pdf	Sumption
AF/SNOWMASS21-AF7_AF4_Barzi-199.pdf	Barzi
SNOWMASS21-AF7_AF0_Vladimir_Matias-251.pdf	Vladimir Matias
SNOWMASS21-AF7_AF4_Luca_Bottura-256.pdf	Bottura
AF/SNOWMASS21-AF7_AF0_Michael_Tomsic-178.pdf	Tomsic
AF/SNOWMASS21-AF7_AF0_Fumitake_Kametani-067.pdf	Kametani
Group 3: High Field Magnet development (9 LoI)	
AF/SNOWMASS21-AF3_AF7-035.pdf	Zlobin (Alexahin)
AF/SNOWMASS21-AF4_AF7-034.pdf	Zlobin (Alexahin)
AF/SNOWMASS21-AF4_AF7-102.pdf	Schulte

Group 3: High Field Magnet development (9 LoI)	(cont.)
AF/SNOWMASS21-AF7-013.pdf	Xiaorong Wang
AF/SNOWMASS21-AF7_AF0-057.pdf	Felice
AF/SNOWMASS21-AF7_AF0-058.pdf	Ferracin
AF/SNOWMASS21-AF7_AF0-111.pdf	Zlobin
AF/SNOWMASS21-AF7_AF0-115.pdf	Gupta
AF/SNOWMASS21-AF7_AF0-175.pdf	Shen
AF/SNOWMASS21-AF7_AF0_Pasquale_Fabbricatoe-067.pdf	Fabbricatore
Group 4: Technology - modeling, fabrication, diagnistics, testing (8 LoI)	
AF/SNOWMASS21-AF7-009.pdf	Caspi
AF/SNOWMASS21-AF7_AF0-107.pdf	Baldini
AF/SNOWMASS21-AF7_AF0-056.pdf	Stoynev
AF/SNOWMASS21-AF7_AF0-IF7_IF0_Diagnostics_WG-105.pdf	Marchevsky
AF/SNOWMASS21-AF7_AF0_Marchevsky-114.pdf	Marchevsky
AF/SNOWMASS21-AF7_AF7_Rob_van_Weelderen-142.pdf	Weelderen
CompF/SNOWMASS21-CompF2_CompF0-AF7_AF0-027.pdf	Arbelaez
AF/SNOWMASS21-AF7_AF0_Peter_McIntyre-238.pdf	McIntyre
Group 5: Detector magnets (4 LoI)	
AF/SNOWMASS21-AF1_AF7-140.pdf	Mentink
AF/SNOWMASS21-AF3_AF7-IF9_IF0-247.pdf	Ning
AF/SNOWMASS21-AF3_AF7-IF9_IF6_Hongbo_Zhu-245.pdf	Yingshun Zhu
AF/SNOWMASS21-AF7_AF7-126.pdf	Sasaki
Group 6: Special magnets - undulators, fast cycling, solenoids (5 LoI)	
AF/SNOWMASS21-AF3_AF7-236.pdf	Barzi
AF/SNOWMASS21-AF7_AF0-185.pdf	Boffo
AF/SNOWMASS21-AF7_AF0_DS_Davis-184.pdf	Davis
AF/SNOWMASS21-AF7_AF0_Diego_Arbelaez-231.pdf	Arbelaez
AF/SNOWMASS21-AF7-004.pdf	Henryk Piekarz

AF7m Letters of Interest

50 LoI received and organized under 6 themes:

1. Global collaboration (6 LoI)
2. High-field arc and IR magnets (15 LoI)
3. Conductor and cable (13 LoI)
4. Detector magnets (5 LoI)
5. Special magnets - solenoids, undulators etc. (7 LoI)
6. Test facilities and measurements/diagnostics techniques (4 LoI)

Main goals:

- Provide a forum for presenting/discussing proposals
- Coordinate writing of white papers, fostering potential collaboration across institutions (Labs, University, Industry) and geographical regions

List of AF7-Magnets White Papers

Group	Lead author	Email	Topic/Title	Arxiv	Reference LoI(s)	Ref. LoI author
1	Prestemon	SOPrestemon@lbl.gov	US MDP - general magnet R&D	2203.13985	AF/SNOWMASS21-AF4_AF7_Prestemon-187.pdf	Prestemon
					AF/SNOWMASS21-AF7_AF0-058.pdf	Ferracin
					AF/SNOWMASS21-AF7_AF0-111.pdf	Zlobin
1	Apollinari	Apollina@fnal.gov	Directed magnet R&D proposal (LEAF)	2203.07654	AF/SNOWMASS21-AF7_AF4-054.pdf	Apollinari
1	Ambrosio	GiorgioA@fnal.gov	Magnet cost reduction	2203.07352	N/A	
1	Vedrine	Pierre.Vedrine@cea.fr	Summary of EU magnet R&D roadmap	2203.08054	AF/SNOWMASS21-AF7_AF0_Luca_Bottura-249.pdf	Bottura
					AF/SNOWMASS21-AF1_AF7_GBisoffi-LRossi-100.pdf	Rossi
					AF/SNOWMASS21-AF1_AF7_M.Seidel-118.pdf	Seidel
					AF/SNOWMASS21-AF7_AF0-057.pdf	Felice
					AF/SNOWMASS21-AF7_AF0_Pasquale_Fabbricatoe-067.pdf	Fabbricatore
1	Bottura	Luca.Bottura@cern.ch	Muon collider magnet R&D collaboration	2203.13998	N/A	
1	Ogitsu	Toru.Ogitsu@kek.jp	Accelerator magnet R&D in Japan	2203.12118	SNOWMASS21-AF0_AF0_toru.ogitsu@kek.jp-019.pdf	Ogitsu
2	Kametani	kametani@asc.magnet.fsu.edu	Iron-based superconductors	2203.07551	AF/SNOWMASS21-AF7_AF0_Fumitake_Kametani-067.pdf	Kametani
2	Larbalestier	larbalestier@asc.magnet.fsu.edu	US conductor R&D status/plans		N/A	
3	Zlobin	Zlobin@fnal.gov	Higgs factory magnets	2203.09010	AF/SNOWMASS21-AF3_AF7-035.pdf	Alexahin
3	Zlobin	Zlobin@fnal.gov	Muon collider magnets	2203.10431	AF/SNOWMASS21-AF4_AF7-034.pdf	Alexahin
3	Wang	XRWang@lbl.gov	REBCO magnet technology	2203.08736	AF/SNOWMASS21-AF7-013.pdf	Wang
					AF/SNOWMASS21-AF7_AF0-125.pdf	Ferracin
3	Gupta	Gupta@bnl.gov	Common coil dipole magnets	2203.0875	AF/SNOWMASS21-AF7_AF0-115.pdf	Gupta
3	Shen	TShen@lbl.gov	Bi-2212 magnet technology	2203.10564	AF/SNOWMASS21-AF7_AF0-175.pdf	Shen
3	McIntyre	p-mcintyre@tamu.edu	Hybrid REBCO magnets	2203.08132	AF/SNOWMASS21-AF7_AF0_Peter_McIntyre-238.pdf	McIntyre
4	Baldini	Mbaldini@fnal.gov	Quench detection w/fiber optics	2203.08309	AF/SNOWMASS21-AF7_AF0-107.pdf	Baldini
4	Stoynev	Stoyan@fnal.gov	Tech development w/subscale models	2203.07274	AF/SNOWMASS21-AF7_AF0-056.pdf	Stoynev
4	Marchevsky	MMartchevskii@lbl.gov	Diagnostics for future colliders	2203.08869	AF/SNOWMASS21-AF7_AF0-IF7_IF0_Diagnostics_WG-105.pdf	Marchevsky
4	Marchevsky	MMartchevskii@lbl.gov	Acoustic diagnostics for training studies	2203.08871	AF/SNOWMASS21-AF7_AF0_Marchevsky-114.pdf	Marchevsky
5	Sasaki-Mentink	ken-ichi.sasaki@kek.jp	Detector solenoids development	2203.07799	AF/SNOWMASS21-AF7_AF7-126.pdf	Sasaki
					AF/SNOWMASS21-AF1_AF7-140.pdf	Mentink
6	Piekarz	hpiekarz@fnal.gov	Fast cycling HTS magnets	2203.06253	AF/SNOWMASS21-AF7-004.pdf	Piekarz

https://indico.fnal.gov/category/1118/attachments/134066/198543/AF7m-WP-tracker-20220315cor.xlsx

Summary Report Guidelines

In preparation for the reports from the frontiers, and to aid in synthesizing a comprehensive vision for U.S. particle physics, we ask that each fron5er address the following general ques5ons in their report:

1. GOALS: Planning for 2025-2035 with a view toward 2050

- What are the important scientific questions in your fronter of par5cle physics during this period?
- What enabling tools, technologies, or facilities studied by your frontier are needed to address the pressing scientific questions in particle physics during this period?
- How can we ensure that the US particle physics community is vibrant, inclusive, diverse, and capable of addressing the scientific questions identified, and of fulfilling our obligations to society during this period?

2. CONTEXT:

- What can be expected from ongoing, approved, planned, or proposed scientific, technical, or community programs in addressing the issues identified by your frontier?

3. OPPORTUNITIES:

- What opportunities identified by your frontier are there for new scientific, technical, or community activities to create transformative change in particle physics, on what timescales could these occur, and what resources are required to realize these activities?
- What investments need to be made during 2025-2035 for the con5nuing scientific, technical, or community progress identified by your frontier in the decades beyond, on what timescales can these be implemented, and what resources would be required?

4. COLLABORATION:

- What opportunities exist for cross-frontier, cross-disciplinary, or international collaboration and cooperation in the coming decade to enhance our ability to address the issues identified (including training or mentorship)?
- How do these collaborations affect the timescales or resources needed for these activities?