Accelerator Frontier

- **Co-Conveners**
  - Steve Gourlay (LBNL, Retired)
  - Tor Raubenheimer (SLAC)
  - Vladimir Shiltsev (FNAL)



Key Questions

1. What is needed to advance the physics?
2. What is currently available (state of the art) around the world?
3. What new accelerator facilities could be available on the next decade (or next next decade)?
4. What R&D would enable these future opportunities?
5. What are the time and cost scales of the R&D and associated test facilities as well as the time and cost scale of the facilities?

Accelerator Frontier Topical Groups and Conveners

Topical Group		Topical Group co-Conveners			
AF1	Beam Phys & Accel. Education	Z. Huang (Stanford)	M. Bei (GSI)	S. Lund (MSU)	
AF2	Accelerators for Neutrinos	J. Galambos (ORNL)	B. Zwaska (FNAL)	G. Arduini (CERN)	
AF3	Accelerators for EW/Higgs	F. Zimmermann (CERN)	Q. Qin (IHEP, Beijing)	G. Hoffstaetter (Cornell)	Angeles Faus-Golfe (IN2P2)
AF4	Multi-TeV Colliders	M. Palmer (BNL)	A. Valishev (FNAL)	N Pastrone (INFN, Torino)	J.Tang (IHEP, Beijing)
AF5	Accelerators for PBC and Rare Processes	E. Prebys (UC Davis)	M. Lamont (CERN)	R.Milner (MIT)	
AF6	Advanced Accelerator Concepts	C. Geddes (LBNL)	M. Hogan (SLAC)	P. Musumeci (UCLA)	R. Assmann (DESY)
AF7	Accelerator Technology R&D				
	Sub-group RF	E. Nanni (SLAC)	S. Belomestnykh (FNAL)	H. Weise (DESY)	
	Sub-Group Magnets	G. Sabbi (LBNL)	S. Zlobin (FNAL)	S. Izquierdo Bermudez (CERN)	
	Sub-Group Targets & Sources	C. Barbier (ORNL)	Y. Sun (ANL)	F. Pellemoine (FNAL)	

9 out of 29 are representatives of Asia and Europe; 5 women

Cross-Frontier- AF Liaisons

- Energy Frontier
  - Dmitri Denisov (BNL)
  - Meenakshi Narain (Brown)
- Neutrino Frontier
  - Laura Fields (FNAL)
  - Alycia Marino (Colorado)
- Rare Processes
  - Bob Bernstein (FNAL)
- Theory
  - Lian Tao Wang (U Chicago)
- Instrumentation Frontier
  - Andy White (UTA)
- Computation Frontier
  - Jean-Luc Vay (LBNL)
- Community Engagement
  - Jeoren van Tilborg (LBNL)
- Snowmass Young
  - Edith Nissen (JLAB)
  - Nikita Kuklev (U. Chicago)

Another task of AF: Analyzing and comparing facility proposals

- We added another working group to handle this task

The “Implementation Task Force” (ITF)

Developed a parameter spreadsheet and solicited community input

- Higgs factory colliders with a typical CM energy of 250 GeV
- High energy lepton colliders with up to 3 TeV CM energy
- Lepton and hadron colliders with 10 TeV or higher parton CM energy
- Lepton-hadron colliders

An additional group consists of versions that could be located at FNAL

AF Implementation Task Force

- Key question for Snowmass'22 Accelerator Frontier to address: "…What are the time and cost scales of the R&D and associated test facilities as well as the time and cost scale of the facility?"
- The Accelerator Implementation Task Force is charged with developing metrics and processes to facilitate the evaluation of proposals and allow a fair comparison between between them, including the expected costs, using the same accounting rules, schedule, and R&D status.
- Liaison with Energy Frontier: Dimitri Denisov, Meenakshi Narain
- Liaison with Theory Frontier: LianTao Wang


Steve Gourlay
(LBNL)


Philippe Lebrun
(CERN)


Thomas Roser
(BNL, Chair)

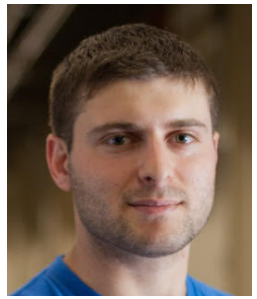

Tor Raubenheimer
(SLAC)


Katsunobu Oide
(KEK)


Jim Strait
(FNAL)


Sarah Cousineau
(ORNL)


Marlene Turner
(LBNL)


Spencer Gessner
(SLAC)


Vladimir Shiltsev
(FNAL)


Reinhard Brinkmann
(DESY)


John Seeman
(SLAC)

Cross-Frontier and Community Engagement

- Accelerator/Energy/Theory Frontiers
  - The **Agoras** (Hosted by Future Colliders Initiative at Fermilab)
    - **Linear e^+e^- colliders**
    - **Circular e^+e^- colliders**
    - **Muon colliders**
    - **Circular pp and ep**
    - **Advanced colliders** (April 13)

Series of events to present and discuss physics and technical aspects of various collider concepts.

Each event consisted of brief presentations followed by a discussion session led by moderators.

- EF conveners: Meenakshi Narain, Laura Reina, Alessandro Tricoli,
- Fermilab Future Colliders group: Pushpa Bhat, Joel Butler
- AF conveners: Steve Gourlay, Tor Raubenheimer, Vladimir Shiltsev

Community Forums – broaden communication

- e^+e^- Forum (AF/IF/EF)
  - AF: Emilio Nanni (SLAC), John Power (ANL)
  - IF: Ulrich Heintz (Brown), Steve Wagner (Colorado)
  - EF: Maria Chamizo Llatas (BNL), Sridhara Dasu (Wisconsin)
  - Aspirations for FCC-ee, C3, HELEN and other potential Higgs/EW facilities

- Muon Collider Forum (EF/AF/TF/IF)
  - Accelerator Frontier: Derun Li, and Diktys Stratakis
  - Energy Frontier: Kevin Black, and Sergo Jindariani
  - Theory Frontier: Patrick Meade, and Fabio Maltoni
  - Aspirations for energy frontier facility in the US

AF Plenaries

- Monday 7/18 3:35
  - **ITF (Implementation Task Force) Report on Future Colliders - from Higgs Factories to the Energy Frontier**
- Tuesday 7/19 2:00
  - **Panel: Careers and Training the Next Generations**
- Tuesday 7/19 3:30
  - **Lepton colliders session**
    - **Theoretical Overview on Lepton Colliders**
    - **e^+e^- Collider Forum presentation**
    - **mu^+mu^- Collider Forum presentation**
    - **Questions and discussion**
- Thursday 7/21 3:30
  - **Accelerator Technologies of the future**

And don’t miss the summaries on Monday 7/25!

AF Parallel Sessions

- Monday 7/18 8:00 – 12:00
  - **EW/Higgs and Multi-TeV Reports (220 Kane)**
- Tuesday 7/19

  8:00 – 12:00
  - **Advanced Concepts and Beam Physics/Accelerator Education (238 MGH)**

  8:00 – 10:00
  - **Accelerator R&D and Production Program (254 MGH)**
    - **Presentation and discussion with Eric Colby, DOE**

  10:00 – 12:00
  - **Synergy with International R&D (254 MGH)**

AF Parallel Sessions

- Wednesday 7/20

  8:00 – 10:00

  - **AF6 (Advanced Concepts) Report (102 JHN)**

  10:00 – 12:00

  - **AF Report Discussion I (102 JHN)**

- Thursday 7/21

  8:00 – 12:00

  - **AF7 (RF and Magnets) (175 JHN)**

  8:00 – 10:00

  - **AF5 (Rare Processes) Report (102 JHN)**

  10:00 – 12:00

  - **AF Report Discussion II (102 JHN)**

AF Parallel Sessions

- Friday 7/22
  8:00 – 12:00
  - **AF2 (Neutrinos) Report and AF7-Targets and Sources Report (332 HUB)**
  - **Multi-TeV (214 HUB)**
  - **Cool Copper Collider (CCC) (340 HUB)**

  10:00 – 12:00
  - **AF-EF Accelerator R&D Overseas (337 HUB)**
- Saturday 7/23
  8:00 – 12:00
  - **AF7 - RF and Magnets Reports (110 Kane)**
  - **AF3 (EW/Higgs) and AF4 (Multi-TeV) (120 Kane)**
- Sunday 7/24
  10:00 – 12:00
  - **AF1 (Beam Physics/Accelerator Education) Report (120 Kane)**
  - **National Future Colliders R&D Program Initiative (220 Kane)**
  - **AF-CompF Cross-cutting issues (210 Kane)**
  - **AF-RF cross-cutting issues (130 Kane)**

AF DRAFT Executive Summary uploaded on indico with this talk