



# Snowmass2021 Electron Source Workshop: Welcome and Introduction

**Yine Sun**

Advanced Photon Source  
Argonne National Lab.

Feb. 16 -18, 2022

# Snowmass2021 Electron Source workshop Welcomes You!

Feb 16 – 18, 2022

US/Central timezone



Overview

Charge

Timetable

Contribution List

My Conference

My Sessions

My Contributions

Registration

Participant List

Organizing Committees

Contacts

 [mgerches@anl.gov](mailto:mgerches@anl.gov)

 [yinesun@anl.gov](mailto:yinesun@anl.gov)



## WORKSHOP ORGANIZERS

Cathodes	Guns	Injectors
Joe Grames (Jlab)	Daniele Filippetto (LBL)	John Power (ANL)
Siddharth Karkare (ASU)	Carlos Hernandez-Garcia (Jlab)	Erdong Wang(BNL)

**Workshop Chair:** Yine Sun (ANL)

**Local Organizing Support:** Anita Garcia (ANL); Maria Gerches (ANL)



Registration

You are registered for this event.

 84

[See details >](#)

# What is Snowmass2021?

<https://snowmass21.org/>

- “Snowmass is organized by the Division of Particles and Fields (DPF) of the American Physical Society. Snowmass will define the most important questions for the field of particle physics and identify promising opportunities to address them.”
- “The P5, Particle Physics Project Prioritization Panel, will take the scientific input from Snowmass and develop a strategic plan for U.S. particle physics that can be executed over a 10 year timescale, in the context of a 20-year global vision for the field. ”
- Snowmass: 2001, 2013, 2022
- Snowmass Summer Study in Seattle: July 17-26, 2022.

## The Future of Particle Physics

Snowmass 2001 • June 30 - July 21

Snowmass Village, Colorado

APS

Organized by the Division of Particles and Fields  
& Division of Physics of Beams of the American Physical Society

Chris Quigg (FNAL), chair  
Sally Dawson (BNL)  
Paul Grannis (Stony Brook)  
David Gross (ITP/UCSB)  
Joseph Lykken (FSLAD)  
Hitoshi Murayama (UC Berkeley)  
René Ong (UCLA)  
Natalie Roe (LBNL)  
Heidi Schellman (Northwestern)  
Maria Spiropulu (Chicago)

Ronald Davidson (PPPP), organizer

Alex Chao (SLAC)

Alex Drago (Maryland)

Gerry Dugan (Cornell)

Norbert Helbig (SNS)

Chan Joshi (UCLA)

Thomas Rorer (BNL)

Ronald Ruth (SLAC)

John Seeman (SLAC)

James Strait (FNAL)

[www.snowmass2001.org](http://www.snowmass2001.org)

Short Courses & Lectures on Critical Technologies  
Organized by the IEEE Nuclear & Plasma Sciences Society

Outreach & Education Programs

## SNOWMASS <sup>CSS</sup> 2013 ON THE MISSISSIPPI JULY 29 - AUGUST 6, 2013

ORGANIZED BY THE DIVISION OF PARTICLES AND FIELDS OF THE APS  
HOSTED BY THE UNIVERSITY OF MINNESOTA

Seattle Snowmass 2022 Home indico Logistics Links About Code of Conduct

Seattle Snowmass Summer Study 2022  
July 17-26, 2022 in Seattle

# Snowmass Working Groups

1. Energy Frontier (EF)
2. Neutrino Physics Frontier (NF)
3. Rare Processes and Precision Frontier (RF)
4. Cosmic Frontier (CF)
5. Theory Frontier (TF)
6. Accelerator Frontier (AF)
7. Instrumentation Frontier (IF)
8. Computational Frontier (CompF)
9. Underground Facilities (UF)
10. Community Engagement Frontier (CommF)

- 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 Processes
- AF6: Advanced Accelerator Concepts
- **AF7: Accelerator Technology R&D**
  - RF
  - Magnets
  - **Targets/Sources**



Charlotte Barbier  
(ORNL)



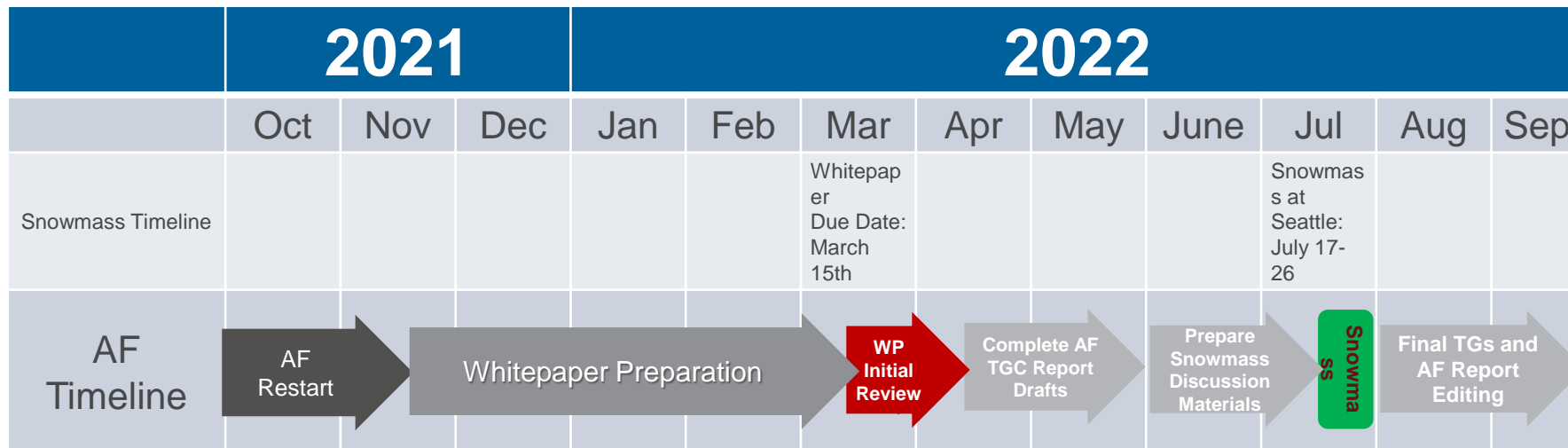
Frederique Pellemoine  
(FNAL)



Yine Sun  
(ANL)

# Snowmass2021 Timeline

- **Contributed Papers** (submission deadline: March 15, 2022)
  - Contributed papers will be part of the Snowmass proceedings.
    - They may include white papers on specific scientific areas, technical articles presenting new results.
    - **A white paper on electron sources will be produced after this workshop.**
    - Encourage collaboration among groups focusing on similar topics
    - These papers and discussions throughout the Snowmass process will help shape the long-term strategy of particle physics in the U.S.
    - Contributed papers will remain part of the permanent record of Snowmass 2021. Instructions for submitting contributed papers are available at <https://snowmass21.org/submissions/start> (both solicited and non-solicited)
- **Final Product: Snowmass Report** (submission: 30 September 2022)



# Snowmass21 Electron Source Workshop Charge

As a workshop organized for Snowmass, the workshop will address the following charges:

- What are the needs/required properties for the electron beams for different applications?
- What is needed to advance the physics of electron sources including cathodes, guns and injectors?
- What is currently available (state of the art) around the world?
- What are the emerging physics concepts and technologies?
- What R&D would enable these future opportunities?
- What new test facilities could be available or will be required in the next decade (or next next decade)?



# Snowmass21 Electron Source Workshop Schedule

US Central Time	Feb. 16: Cathodes Convenors: Joe Grames, Siddharth Karkare	Feb. 17 Guns Convenors: Daniele Filippetto, Carlos Hernandez-Garcia	Feb. 18: Injector Convenors: John Power, Erdong Wang
9:40	Welcome and Introduction (Yine Sun)		
10:00	Electron Source Requirements for Electron Colliders (Andrea Latina)	Electron Source Requirements of Electron Ion Collider (Erdong Wang)	Electron Source Requirements for Advanced Accelerators (Spencer Gessner)
10:30	Overview of High QE photocathode R&D in Europe (Daniele Sertore)	Capability and Future Ideas of Polarized Beams from GaAs in DC HV Photo-guns (Joe Grames)	High Brightness Photoinjectors Based on High Gradient C-band Technology (Thomas Lucas)
10:55	Cathode R&D needs and status for European High energy physics/Nuclear Physics projects (Kurt Aulenbacher)	Recent Progress on advanced photocathode operation in SRF Guns (Rong Xiang)	Shaping for Electron Injectors (Matthias Gross)
11:20	Cathode technologies to produce highly spin-polarized electron beams (Matt Poelker)	CW Normal-Conducting RF sources for future linear colliders (Daniele Filippetto)	Development of a Damping Ring Free Electron Injector for Linear Collider (Tianzhe Xu)
12:00	Cathodes to produce ultra bright beams for accelerators including XFELs and UED (Jared Maxson)	The First Beam of an Ultrahigh Gradient RF Photogun (Chunguang Jing)	Plasma Photocathode Injectors (Carl Schroeder)
12:25	Robust Cathodes to Produce High Current Electron Beams (Luca Cultrera)	Ultra-high brightness cryogenic gun for linear collider and FEL applications (James Rosenzweig)	A Low Emittance Injector for LCLS-II HE (Fuhao Ji)
12:50	Cathodes Characterization and Fabrication needs for existing and future DOE HEP/NP projects (John Smedley)	Particle Sources for Advanced Accelerators (Matthias Fuchs)	LCLS Injector using Pulsed RF Gun and LCLS-II CW Gun (Feng Zhou)
13:30	Discussions	Discussions	Discussions and Closeout

# Thank you for your participation in the workshop!

**Speakers, please send your presentation to your convenors, thank you!**

- Please mute and turn off your video if you are not speaking
- Use the “raise hand” or “chat” feature for questions or comments