

SLAC's Advanced Accelerator Contributions to Snowmass

Spencer Gessner
SLACmass Summary
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U.S. DEPARTMENT OF
ENERGY

Stanford
University

SLAC NATIONAL
ACCELERATOR
LABORATORY

List of White Papers

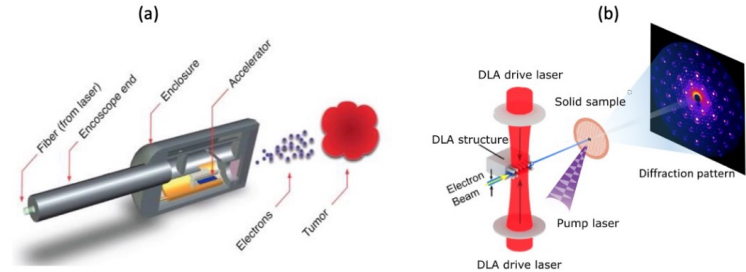
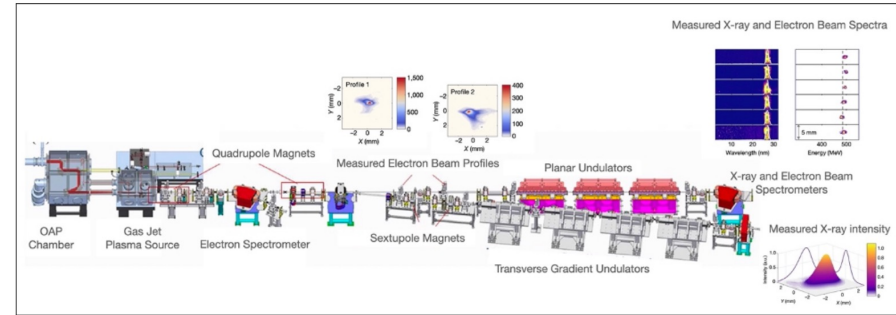
- Near Term Applications driven by Advanced Accelerator Concepts
 - C. Emma, J. England, S. Gessner, F. Fiuza
- Channeling Acceleration in Crystals and Nanostructures and Studies of Solid Plasmas
 - H. Ekerfelt, F. Fiuza
- Continuous and Coordinated Efforts of Structure Wakefield Acceleration (SWFA)
 - E. Nanni, J. Lewellen
- Linear collider based on laser-plasma accelerators
 - S. Gessner, M. Hogan
- Advanced accelerator linear collider demonstration facility at intermediate energy
 - S. Gessner, M. Hogan, T. Nelson
- Beam-Driven Plasma Linear Colliders
 - S. Gessner, M. Hogan, B. O'Shea, M. Peskin, T. Raubenheimer, G. White, V. Yakimenko
- Beam Delivery and Final Focus Systems for Multi-TeV Advanced Linear Colliders
 - G. White, S. Gessner, M. Hogan

Near Term Applications driven by Advanced Accelerator Concepts

This white paper covers:

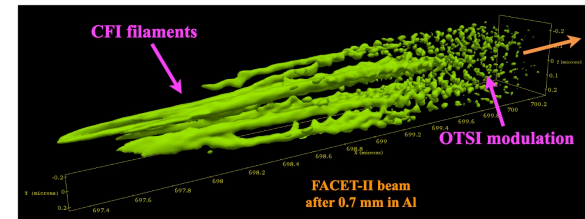
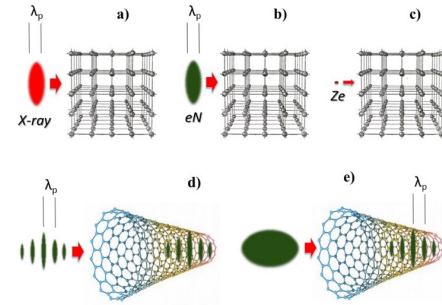
- Light Source Applications
- Medical Applications
- Fundamental Physics Applications

“Successful near-term application environment will naturally guide particle accelerator technology to maturity.”



This white paper covers:

- Particle acceleration in crystals
- Beam-plasma interaction at solid density
- Muon channeling in crystals



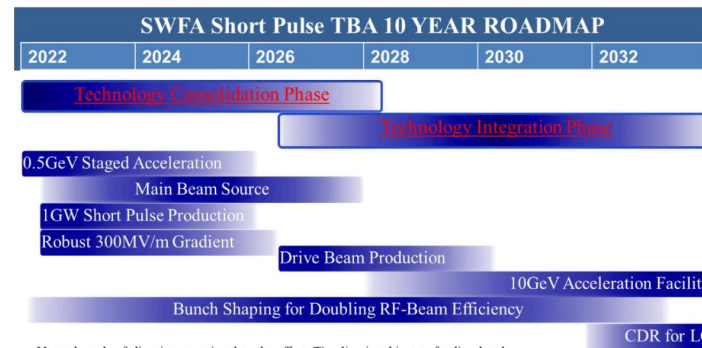
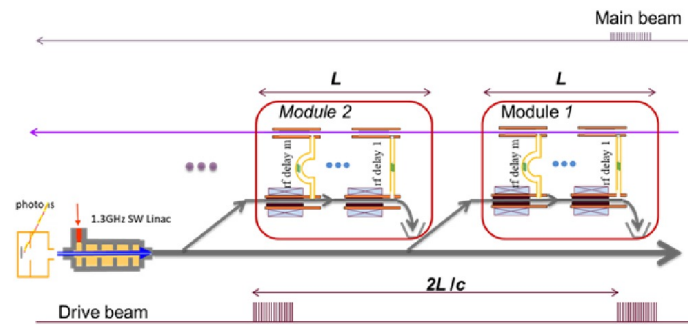
Continuous and Coordinated Efforts of Structure Wakefield Acceleration



This white paper covers:

- Argonne's concept for a Structure-Based Linear Collider
- Continued R&D Topics
- Emphasis on support for research facilities.

“A thorough integrated design study (IDS) is needed to mature the design beyond the strawmand phase.”



Lead authors: Chunguang Jing, ANL
SLAC contributors: E. Nanni, J. Lewellen

This white paper covers:

- Emphasis on vigorous research
- R&D on high-rep rate, high-efficiency laser drivers

“A critical advance will be the development of an integrated design study for an LPA-based collider that will include preliminary designs for all the collider subsystems.”

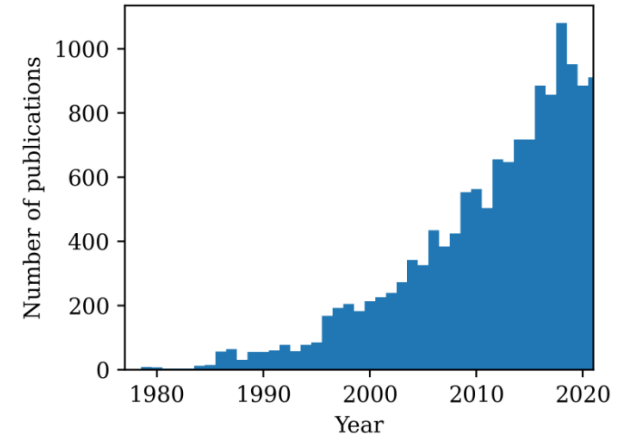


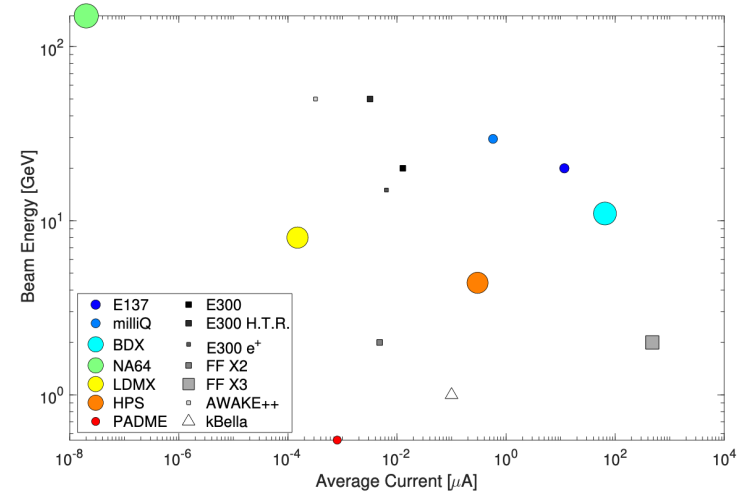
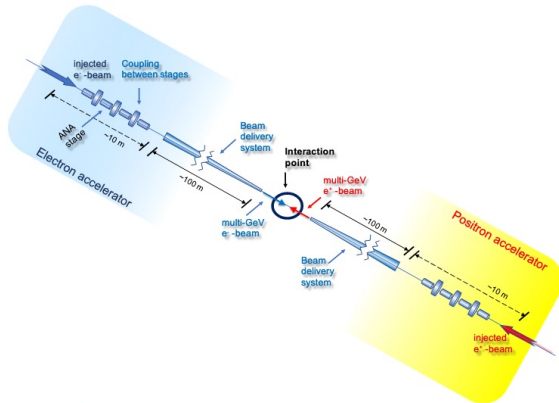
FIG. 1. Number of publications per year as obtained from a Google Scholar search on articles containing all of the following keywords: “laser+plasma+wakefield+accel*”.

Advanced accelerator linear collider demonstration facility at intermediate energy



This white paper covers:

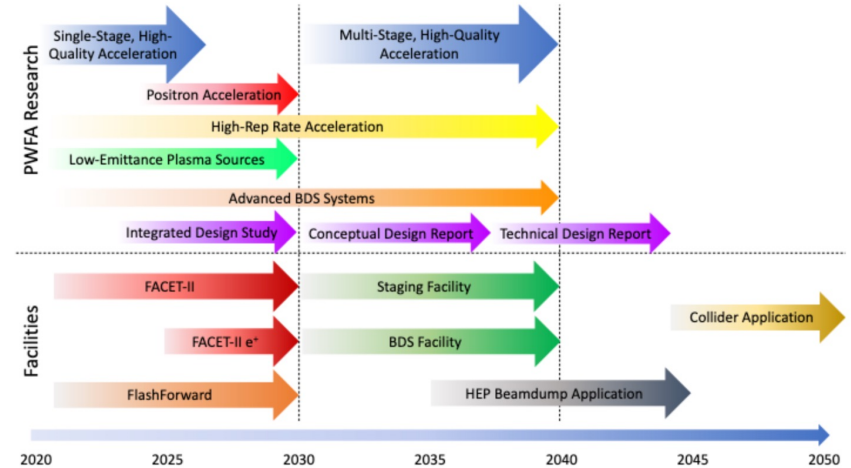
- An intermediate-energy linear collider as a demonstration facility.
- Beam dump and QED applications



Lead authors: Stephan Bulanov, LBNL
SLAC contributors: S. Gessner, M. Hogan, T. Nelson

This white paper covers:

- R&D Topics on the path to a beam-driven plasma collider.
- Support for research facilities
- New support for a facility to demonstrate staging

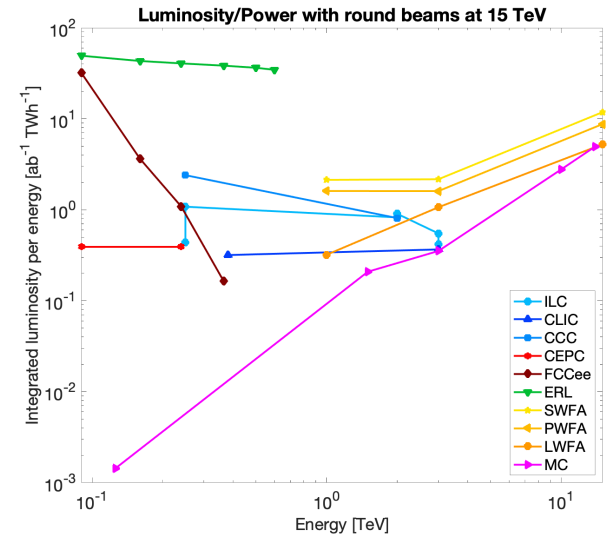


“Support for an Integrated Design Study of a high energy (1-15 TeV) PWFA-based collider be performed that details all the components of the system. . . .”

Lead authors: Spencer Gessner, SLAC
SLAC contributors: M. Hogan, B. O’Shea, M. Peskin,
T. Raubenheimer, G. White, V. Yakimenko

This white paper covers:

- R&D Topics on beam delivery systems for Advanced Accelerators.
- Inclusion of plasma lenses in final focus design.
- Machine-Detector Interface Considerations.
- Transition to round beam collisions at the highest energies.



Main Message to Snowmass

The Advanced Accelerator Community is united in our effort to provide a path toward extremely high-energy collisions using novel technology. We are requesting support for an Integrated Design Study that will lead to a consistent concept for the Multi-TeV future collider.