Update on White Paper on: Beam Driven Plasma Linear Colliders

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Snowmass AF6 Meeting

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U.S. DEPARTMENT OF ENERGY | Stanford University

SLAC NATIONAL ACCELERATOR LABORATORY

White Paper on Beam-Driven PLC

- The White Paper on Beam-Driven PLC roughly follows the outline discussed with Eric Esarey and Carl Schroeder in the PASAIG meeting. The draft is here:
  - https://www.overleaf.com/read/xdccmbzmmftb

Snowmass White Paper on Beam-Driven Plasma Linear Colliders

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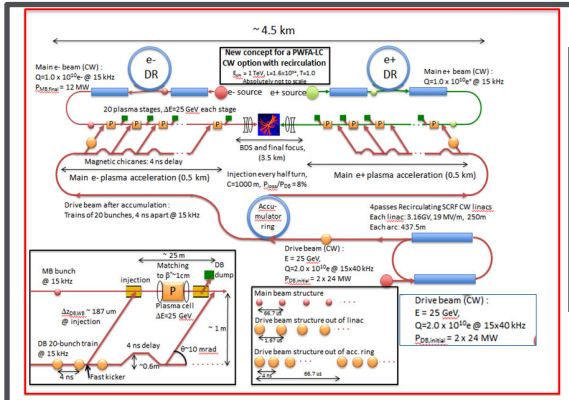
Outline of White Paper on PLC

- “Previous Designs and Roadmaps” section to explain how thinking on this topic has evolved over the years.
- “Research Milestones since last Snowmass” section to emphasize progress in the field.
- “Plasma Linear Collider Concepts” with emphasis on machine extensions/upgrades (e.g. ILC, CLIC, CCC).
- “R&D Topics”
  - Reference Beam Delivery System White Paper
- “Research Facilities”
- “Conclusion with emphasis on IDS”

CONTENTS

PLC History and Roadmaps



E. Adli *et. al.*,arXiv:1308.1145 [physics.acc-ph]

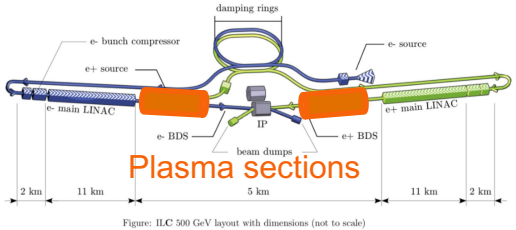
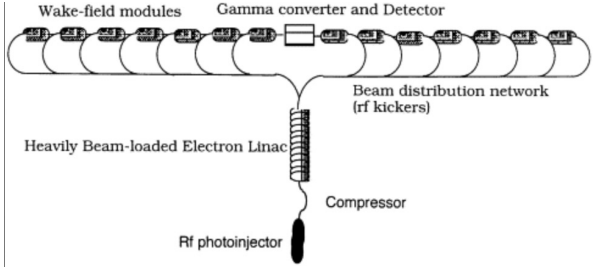
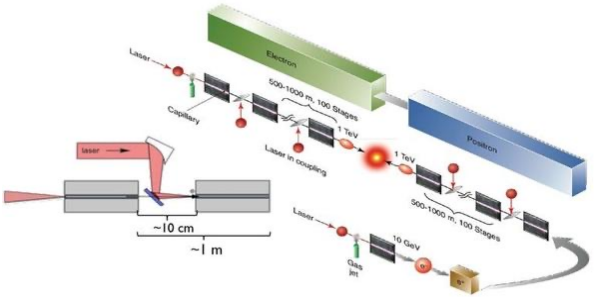


Figure: ILC 500 GeV layout with dimensions (not to scale)

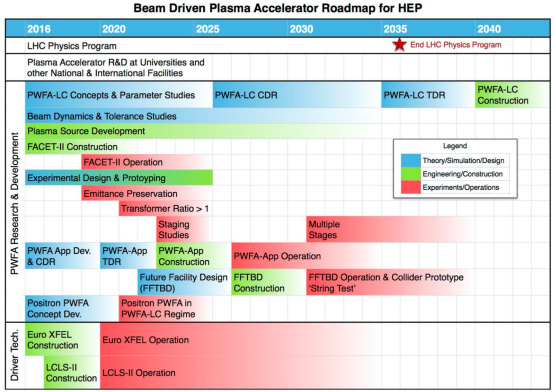
For some considerations on the plasma afterburner, see for example T. Raubenheimer, AIP Conf. Proc. 2004.



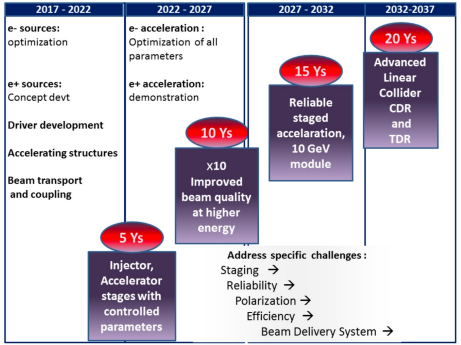
J. Rosenzweig *et. al.*, NIMA (1998)



C. B. Schroeder, et. al. Phys. Rev. ST Accel. Beams **13**, 101301



DOE Workshop Report (2016)



ANAR Report (2017)

Extensions and Upgrades of Existing LCs

SLAC

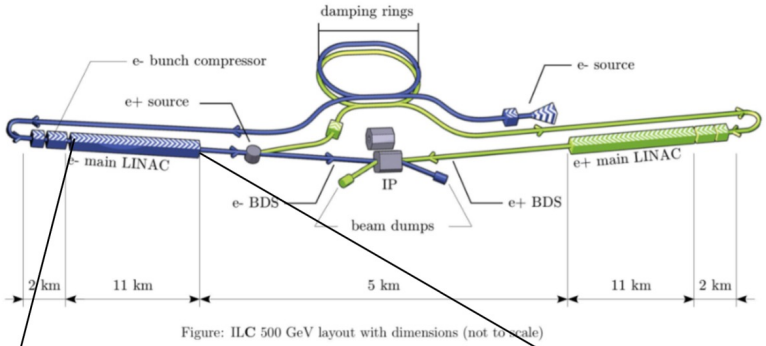
Use the existing linac but split it in pieces.

Pros:

- Uses existing linac “in-situ”.
- Achieves energy multiplication through use of high-transformer ratio acceleration (linac sections are optimized for high-charge, shaped drive beams).

Cons:

- Space is at a premium!
- Need to convert SRF cavities to CW.



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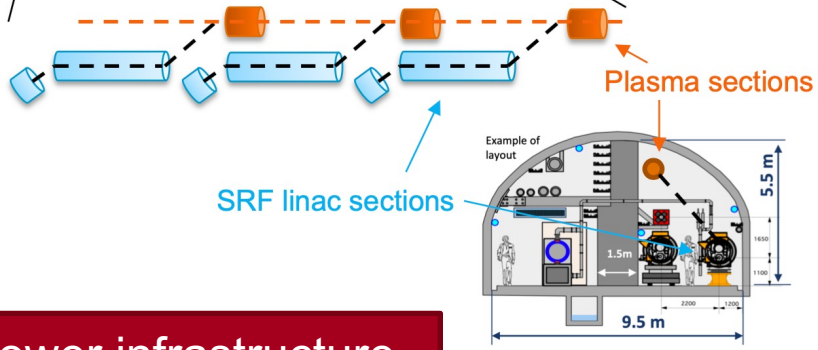

Emphasis on using existing civil and power infrastructure

Summary

- Sections assigned to co-authors but more input and authors are welcome.