

ALEGRO WG5 (ALEGRO FO[U]RTE[V])

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Agenda

Session 1: 'Strategy'

Session 2 'Plasma based injectors'

'Plasma based injector concepts and beam quality', B. Hidding

'extension of CLIC-drive beam concept to 20 GeV for a PWFA-based colider', Daniel Schulte

Session 3 'Drive beam acceleration design'

'Hosing, BBU' Vladyslav Libov

'Emittance preservation in plasma wakefield accelerators' T. Mehrling

Limitations efficiency versus instability, B. Chen

Session 4,, Jointly with WG1 and WG2

Talk: 'proton driven PWA schemes', E. Gschwendtner

...

Session 5, 'Positron acceleration', joint with WG8

Session 6, 'Beam quality preservation and staging'

'Staging of PWAs' E. Adli

'Polarisation preservation' J. Vieira

Session 7, 'Identification of possible facilities and next steps'

'Overview of (current and future) PWFA facilities and their unique capabilities' M. Hogan

Wrap-up.

Strategy of for ESGG Documents

General Input: valid for all WGs

- Motivation
 - Long-term vision:
 - 30 TeV CM collider, e+e-, gamma/gamma
 - Mid-term vision:
 - Upgrade of existing linear colliders (ILC, CLIC)
 - Plasma Electron Proton/Ion Collider (PEPIC)
 - Fixed target experiments

WG5 Chapter for long supplementary document

- Short-term vision:
 - Need strong R&D program (tbd today...)
 - what is achieved already ?
 - what are the next milestones ?
 - what are the possible show-stoppers, and how can these be addressed?
 - What are the planned near term test facilities or 1/2-stage demonstration accelerators?
 - What is the interested community?

Facilities for ALEGRO FORTE

<i>Facility</i>	<i>Particle Species</i>	<i>Motivated Contact Person</i>
AWAKE	p	E. Gschwendtner/P. Muggli
Asia		W. Lu
CLEAR	e ⁻	E. Adli
CLARA	e ⁻	G. Xia
INFN-EuPRAXIA@SPARC_LAB	e ⁻	M. Ferrario
MAX IV	e ⁻	O. Lundh
ATHENA	e ⁻	R. Assmann
FLASHForward	e ⁻	J. Osterhoff
FACET-II	e ⁻ & e ⁺	M. Hogan, V. Yakimenko

Strategy for ALEGRO FORTE

What needs to be demonstrated:	5Y	10Y	15 ⁺ Y
Accelerating gradient	~10GeV		
Emittance preservation	μm-rad demonstration	μm-rad	nm-rad
Beam-beam efficiency	50%	50%	>50%, shaped
Energy spread	%-level, unshaped, loading	<1% shaped bunches	
Staging	Concepts	requires facility 2D+W @GeV energies	Demonstration
Drive beam for collider	Concepts (CLIC concepts)	requires test facility	Demonstration
Main or witness bunch	Shaping, beam source	requires test facility	Demonstration
Hosing BBU	to be studied at mum-level	requires collider-like W-bunch	Demonstration
Plasma source	High average power beam, fluid simulations	requires test facility	Demonstration
Plasma entrance/exit	Designs/experiments, shaping	available	
Diagnostics	Develop/test , optical?	Adapt to nm-rad levels	
Collider Concepts (e+/e-, e-/p, γ/γ)	Optimization	Optimization	Design Report
Luminosity concepts	Concepts	Concepts for 10 ³⁶	
Tolerances, stability, reproducibility	Simulations, tests	requires test facility	Demonstration
Simulation Tools	start-to-end	parameter scans	

Strategy for ALEGRO FORTE

- Identify and prioritize key challenges for PWFA based HEP
- Review facilities
- Identify new facilities
 - Identify overlap with LWFA
 - Identify overlap with SWFA
- Coordinate studies within ALEGRO FORTE
- Intensify HEP specific research for PWFA