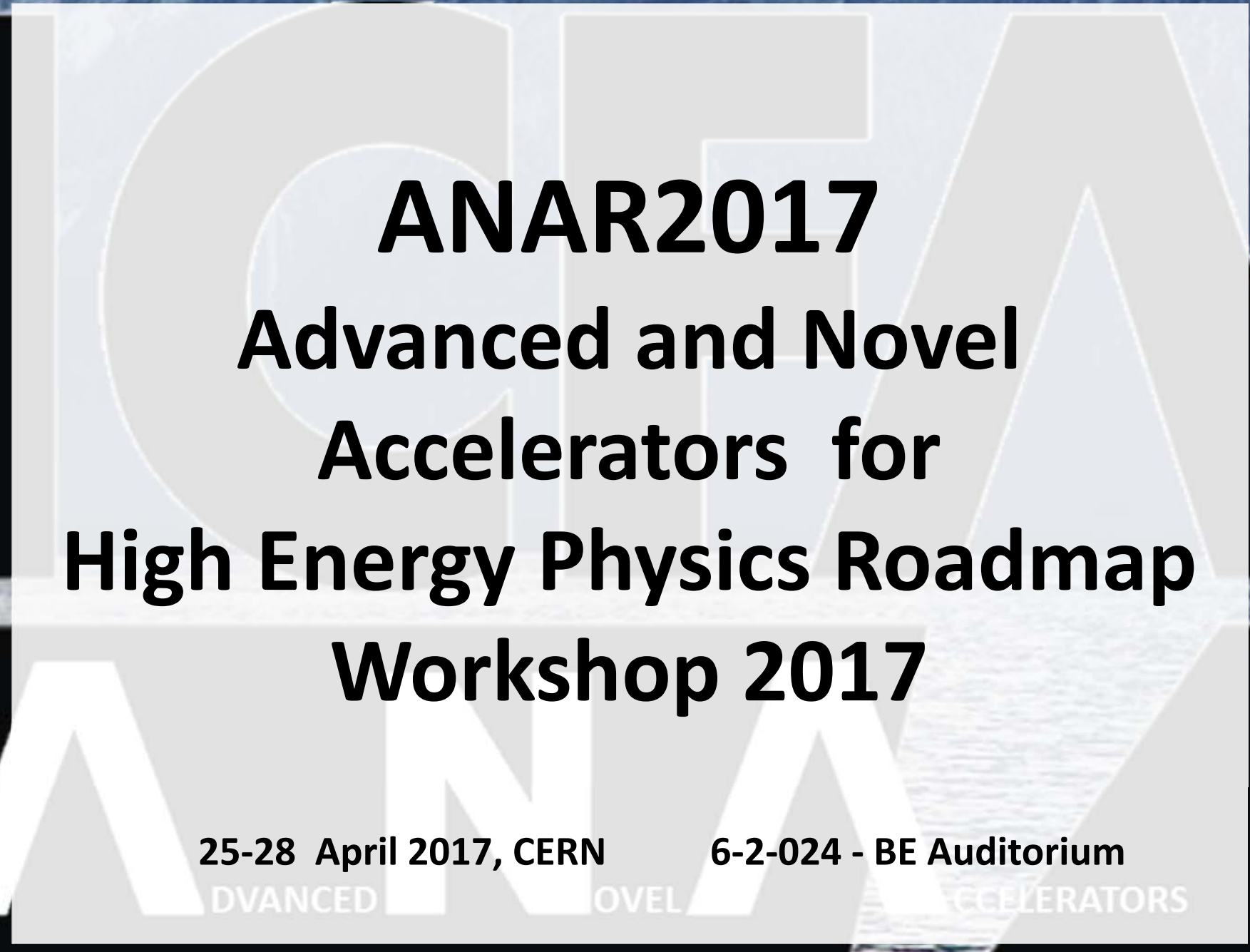


ANAR2017 workshop

25-28 April 2017, CERN

6-2-024 - BE Auditorium

ANNA
ADVANCED LEVEL ACCELERATORS

A large, semi-transparent watermark of the acronym 'ANAR' is centered in the background of the slide. The letters are white and have a slight shadow effect.

ANAR2017

Advanced and Novel Accelerators for High Energy Physics Roadmap Workshop 2017

25-28 April 2017, CERN

6-2-024 - BE Auditorium

ADVANCED

NOVEL

ACCELERATORS



Organised at the initiative of the ICFA panel for Advanced and Novel Accelerators

Organizing Committee

ICFA Panel members

- **Brigitte Cros (chair)**, CNRS- U PSud, France
- Patric Muggli, MPP, Germany
- Bruce Carlsten, LANL, USA
- **Massimo Ferrario**, INFN, Italy
- **Brian Foster**, U Hamburg, Oxford, DESY, Germany
- **Ryoichi Hajima**, NIQRST, Japan
- **Dino Jaroszynski**, U Strathclyde, UK
- Philippe Piot, NI U (USA), Fermi Lab.
- **James Rosenweig**, UCLA, USA
- **Carl Schroeder**, LBNL, USA
- Chuanxiang Tang, Tsinghua U, China
- **Mitsuru Uesaka**, U Tokyo, Japan
- **Mitsuhiro Yoshida**, KEK, Japan

Other members

- **Ralph Assmann**, DESY, Germany
- **Edda Gschwendtner**, CERN, Switzerland
- **Bernhard Holzer**, CERN, Switzerland

Sponsored by



European Organization for Nuclear Research
Organisation européenne pour la recherche nucléaire

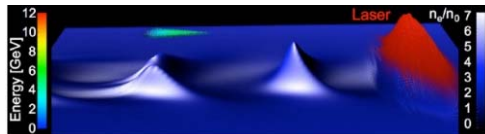


Goal of the workshop

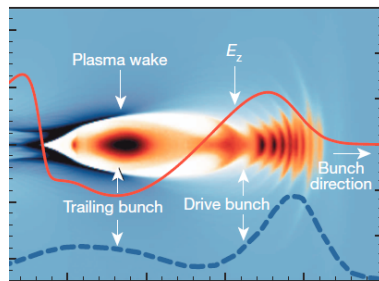
- ❖ To define an **international roadmap towards colliders based on advanced accelerator concepts**, including intermediate milestones, and to discuss the needs for international coordination.
- ❖ <https://indico.cern.ch/event/569406/overview>

Advanced Accelerator concepts discussed in 4WGs

❖ At this workshop

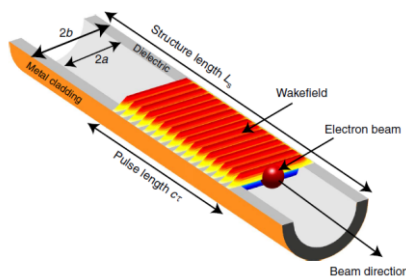


❖ Wakefields driven in **plasma** by **intense** laser beams

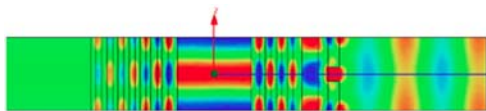


❖ Wakefields driven in **plasma** by **particle** beams

❖ Wakefields driven in **dielectric tubes** by **particle** beams



❖ Wakefields driven in **dielectric structures** by **short-pulse** lasers





Multi TeV electron/positron collider for HEP:

Questions addressed during the workshop

- ❖ What are the scientific and technical bottlenecks ?
- ❖ What are the possible solutions for each advanced concept?
- ❖ What are the next milestones ?
- ❖ What kind of collaboration / coordination does the community need ?

This workshop will benefit from previous work

- ❖ Roadmaps for future accelerators using plasmas or advanced concepts discussed
 - ❖ In the **USA** (4 workshops between Oct 2015 and Feb 2016)
 - ❖ In **Europe**, in the frame of European projects (network activity Euronac, Design Study Eupraxia)
 - ❖ In **Asia**, activities in individual countries
- ❖ Globally coordinated roadmap should be discussed

 This is the purpose of this workshop



Organisation of the ANAR₂₀₁₇ workshop

- ❖ Chair **B. Cros** (CNRS), co-Chair **P. Muggli** (MPP)
- ❖ Organized at the initiative of ANA panel, strong support from CERN hosting the workshop (**B Holzer**)
- ❖ **Largely opened to the scientific community**
- ❖ **Working groups** will examine schemes to reach parameters relevant to a high-energy collider
- ❖ **Plenary discussion** of the **WG results (scientific roadmaps)** and of the **strategy to push forward** the development of advanced accelerators in the context of the next international project at the TeV scale.
- ❖ The results will be synthesized in a **document** that will be broadly distributed.



Preparation of the workshop report

- ❖ **Organizing committee** will edit a document to disseminate the output of this workshop to strategy and decision making bodies
- ❖ **Working group leaders** will coordinate summaries including:
 - **State-of-the-art** of the acceleration scheme relevant to HEP
 - Main challenges to be addressed in the next **5 /10 years**
 - **Long term view** for the acceleration scheme application to HEP
 - **Technologies that need to be developed** to reach the goals above
 - **Conclusion and outlook**

Programme 1/2

- ❖ **Plenary Introductory talks** on WG topics, indicating status status and key issues, to be discussed in each WG
- ❖ **Laser WakeField Accelerator (WG1):** M.Downer (U Texas)
- ❖ **Dielectric Wakefield Accelerator (WG3):** J. Rosenweig (UCLA)
- ❖ **Direct Laser Accelerator (WG4):** E. Simakov (LANL)
- ❖ **Introduction to WGs sessions: WG leaders (1 to 4)**
- ❖ **Lunch break**
- ❖ **Plasma WakeField Accelerator (WG2):** M. Hogan (SLAC)
- ❖ **WG sessions to propose scientific roadmap; coordinators**
- ❖ WG1 : A. Specka (CNRS), D. Gordon (NRL), C. Schroeder (LBNL)
- ❖ WG2 : A. Calwell (MPP), M. Hogan (SLAC), E. Gschwendtner (CERN)
- ❖ WG3 : J. Power (ANL), P. Craievich (PSI), P. Piot (FermiLab)
- ❖ WG4 : J. England (SLAC) , J. McNeur (U Erlangen) , B. Carlsten (LANL)

- ❖ **WG reports (plenary) and brainstorming discussion, scientific roadmap toward colliders, Chair: S. Hooker (Oxford U.)**

ANAR2017



Programme 2/3

- ❖ **Plenary talks on strategy for different parts of the world and discussion**
- ❖ Review of Advanced Accelerator Development in Japan: Masaki Kando (QST)
- ❖ Strategy in Asian countries, ongoing efforts in China: Xueqing Yan (PKU)
- ❖ Strategy in the USA: Andrew Lankford (UCIrvine)
- ❖ Strategy in European countries: national programs: Bernhard Holzer (CERN)
- ❖ Ongoing efforts towards coordination in Europe : Ralph Assman (DESY)
- ❖ Discussion on the perspectives for international collaborations on AAD, chair Maurizio Vretenar (CERN)

ANAR2017

Programme 3/3



❖ **Plenary talks on coordination and discussion**

- ❖ Vision for AAD coordination in Europe, existing organisation and perspectives: Roy Aleksan (CEA)
- ❖ Vision for international coordination: Wim Leemans (LBNL)
- Discussion about next steps and conclusion of the workshop, chair/moderator : B. Cros/P. Muggli



International Committee for Future Accelerators
<http://www.fnal.gov/directorate/icfa/index.html>

Sponsored by the Particles and Fields
Commission of UIPAP

Panel on Advanced and Novel Accelerators

Mission: To extend and support the international collaboration
and communication in the field of new acceleration techniques.

<http://www.lpgp.u-psud.fr/icfaana>



Extra slides



ICFA ANA website



- ❖ <http://www.lpggp.u-psud.fr/icfaana>
- ❖ Objective: provide a comprehensive view of the rapidly growing field of advanced accelerators
- ❖ Main pages
 - [Panel Members](#)
 - [Endorsed Events](#)
 - [Research Activities](#)
 - [Publications](#)
 - [Meetings](#)
 - [Reports](#)
 - [ANA Events](#)

You are here: Home → Research Activities

Navigation

- Panel Members
- Endorsed Events
- Research Activities**
- Europe
- Asia
- America
- Images
- Publications
- Meetings
- Reports
- Members search
- ANA Events
- links
- Files

Log in

Login Name

Research Activities

Advanced Accelerators Resea

Europe

European laboratories, institutes content please contact Patric Muğ

[Read More...](#)

Asia

Asian laboratories, institutes or p please contact Chuanxiang Tang,

[Read More...](#)

America

American laboratories, institutes content please contact Bruce Car

[Read More...](#)

Images

These images are the property of contact person

[Read More...](#)



ICFA ANA website:

- ❖ <http://www.lpgp.u-psud.fr/icfaana>
- ❖ 3 main areas (USA, Europe, Asia): panel members in charge of contacting groups in each area to obtain information and post it on the pages (short text, picture, and email for contact person)
- ❖ Work in progress: 43 groups listed to date
- ❖ List of publications in refereed international journals in the field, starting from 2015

FACET-II Science Opportunities Workshops: Wednesday Session Focussed on Plasma Colliders



SLAC NATIONAL ACCELERATOR LABORATORY

- Home
- Agenda
- FACET-II CDR
- Participants
- Register
- Accommodations
- Travel and Directions
- Meeting Rooms & Maps

**FACET-II
Science Opportunities Workshops**

12-16 October, 2015
SLAC National Accelerator Laboratory
Menlo Park, CA

Representatives from:

- DESY, FNAL, INFN, IST, JAI, LBNL, Oslo, MPP, SLAC, Strathclyde, UCLA

Topical Areas:

- Setting the stage
- Plasma based-LC designs
- Major challenges & technical issues
- Specific R&D experiments to address issues

October 12-16, 2015	WG Leaders	Workshop
Monday	Pietro Musumeci (UCLA) Zhirong Huang (SLAC)	Accelerator Physics of Extreme Beams
Tuesday	Ioan Tudosa (U. Penn.) Jerome Hastings (SLAC)	Material Interactions with Extreme Fields
Wednesday	Andrei Seryi (JAI) Jean-Pierre Delahaye (SLAC)	Plasma Acceleration Based Linear Colliders
Thursday	James Rosenzweig (UCLA) Erik Hemsing (SLAC)	Plasma Acceleration Based XFELs
Friday	Vladimir Litvinenko (Stonybrook) Carsten Hast (SLAC)	Application of Compton Based Gamma Rays

Developments in producing a US strategy on novel acceleration

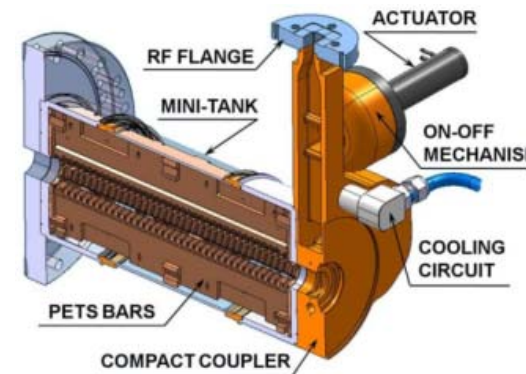
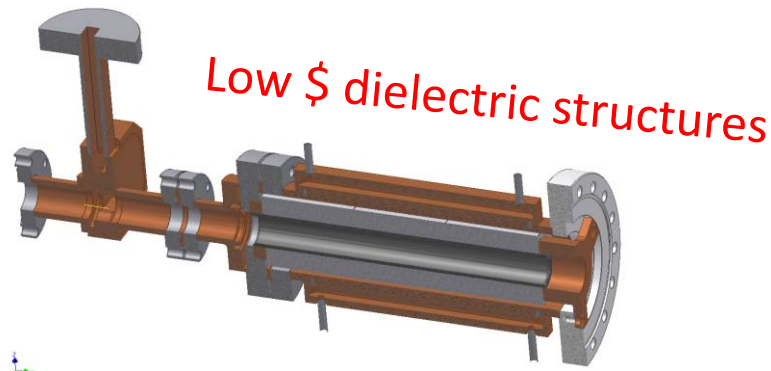


- ❖ In response to HEPAP Accelerator R&D Subpanel report: Accelerating Discovery— A Strategic Plan for Accelerator R&D in the U.S.[http://science.energy.gov/~media/hep/hepap/pdf/Reports/Accelerator RD Subpanel Report.pdf](http://science.energy.gov/~media/hep/hepap/pdf/Reports/Accelerator_RD_Subpanel_Report.pdf)
 - *Report Recommendation:* “Convene the university and laboratory proponents of advanced acceleration concepts to develop R&D roadmaps with a series of milestones and common down-selection criteria towards the goal of constructing a multi-TeV e+e- collider.”
- ❖ 2016 Advanced Accelerator Concepts Research Roadmap Workshop (U.S. DOE, 2-3 Feb 2016)
 - *Workshop Goal:* develop a 10-year comprehensive R&D roadmap with appropriate milestones for the advanced accelerator concepts within the HEP General Accelerator R&D (GARD) program, unifying three approaches: Laser-plasma wakefield accelerator (LWFA), particle-beam-driven plasma wakefield accelerator (PWFA), dielectric wakefield accelerator (DWFA)

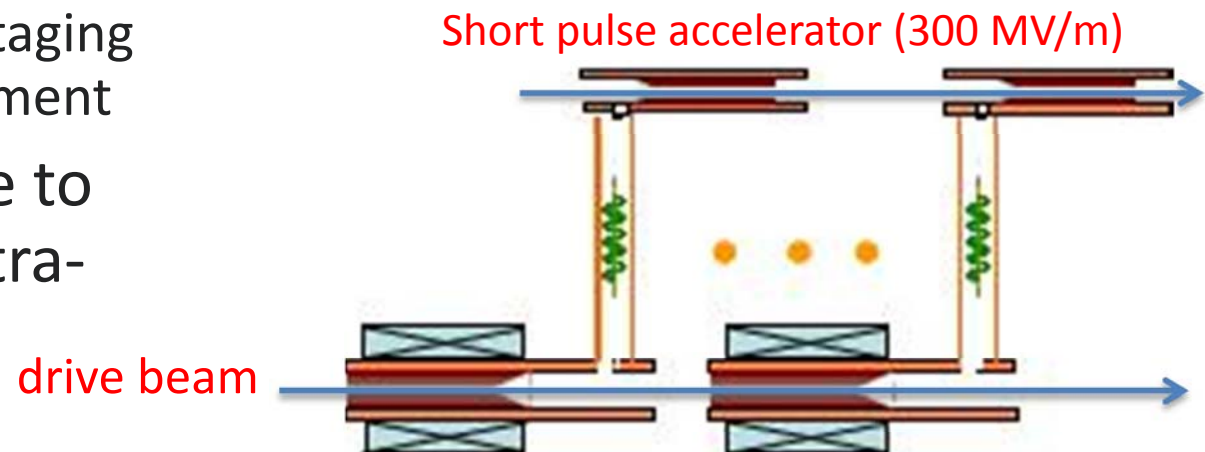
STRUCTURE-BASED WAKEFIELD ACCELERATOR FOR A TEV-CLASS LINEAR COLLIDER



- ❖ Organized by Argonne Wakefield Accelerator group, Dec. 1-2 2015, ~20 participants (by invitation only)



- ❖ reviewed structures for wakefield acceleration
- ❖ discussed critical-technology element
 - ❖ main-beam acceleration/staging
 - ❖ drive beam power requirement
- ❖ phased design: buildable to more extreme design (ultra-low emittance)



LBNL Workshop on Plasma-based Accelerator Concepts for Colliders



- ❖ 6-8 Jan 2016; LBNL, Berkeley, CA; 55 participants
- ❖ Discussions towards an R&D roadmap toward a plasma-based collider.
- ❖ 3 Working Groups: particle-driven, laser-driven, laser-technology
- ❖ Roadmaps covered a period extending to ~ 2040 , with completion of a multi-TeV e^+e^- plasma-based collider Technical Design Report in the 2035-2040 timeframe.
- ❖ LBNL Workshop in preparation for 2016 AAC Research Roadmap Workshop (U.S. DOE, Washington, DC, 2-3 Feb 2016)