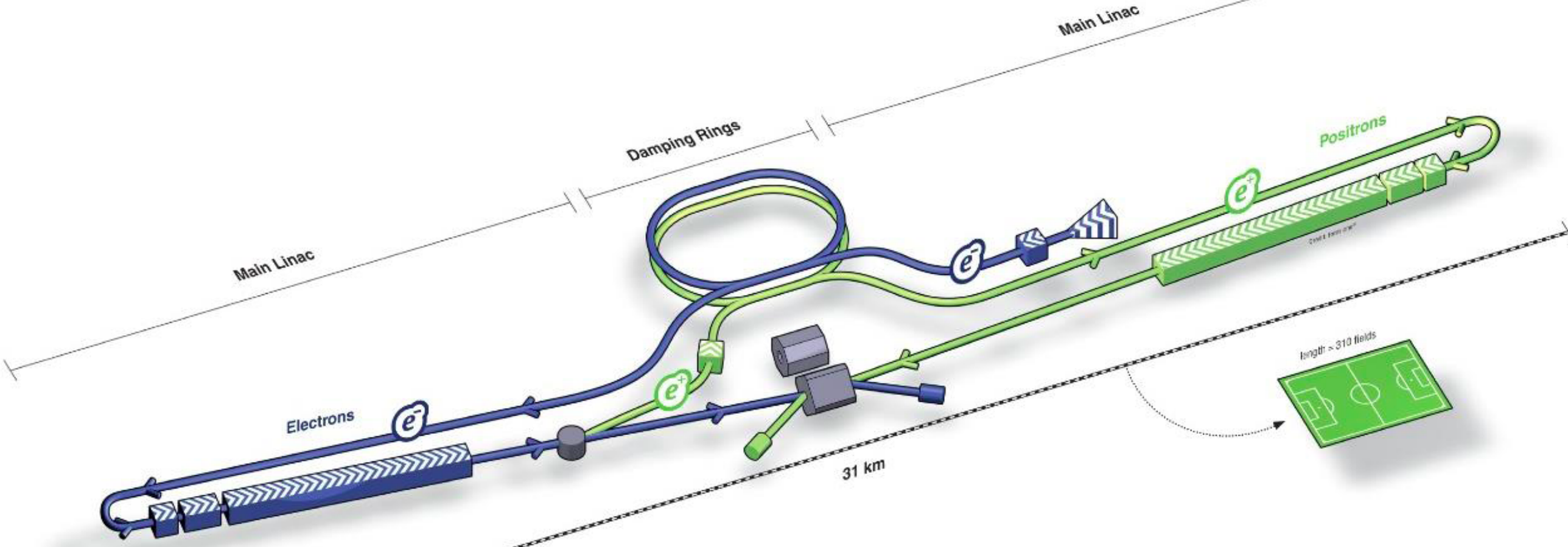


ILC/CLIC

LINEAR COLLIDER COLLABORATION

Hitoshi Murayama (Berkeley & Kavli IPMU)

CEPC 2018 Workshop

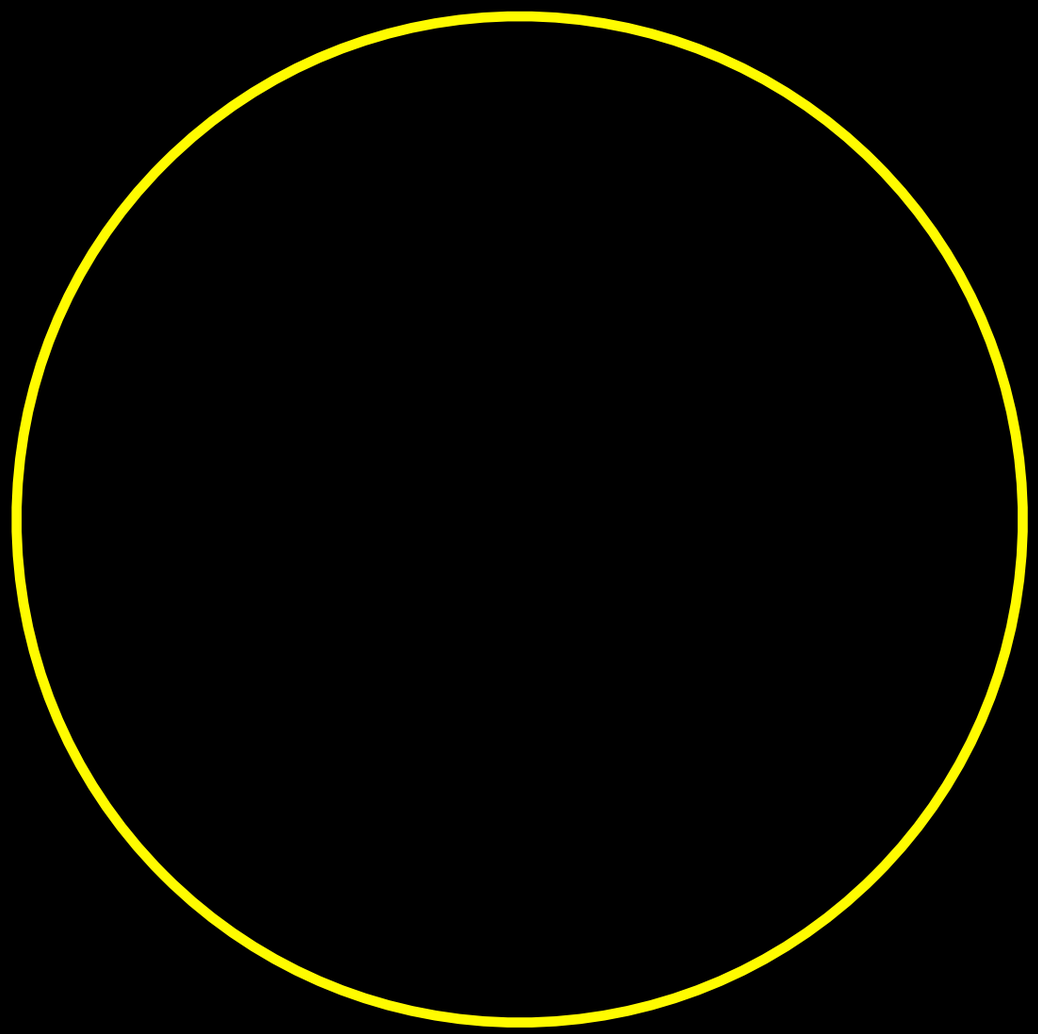
BERKELEY CENTER FOR THEORETICAL PHYSICS

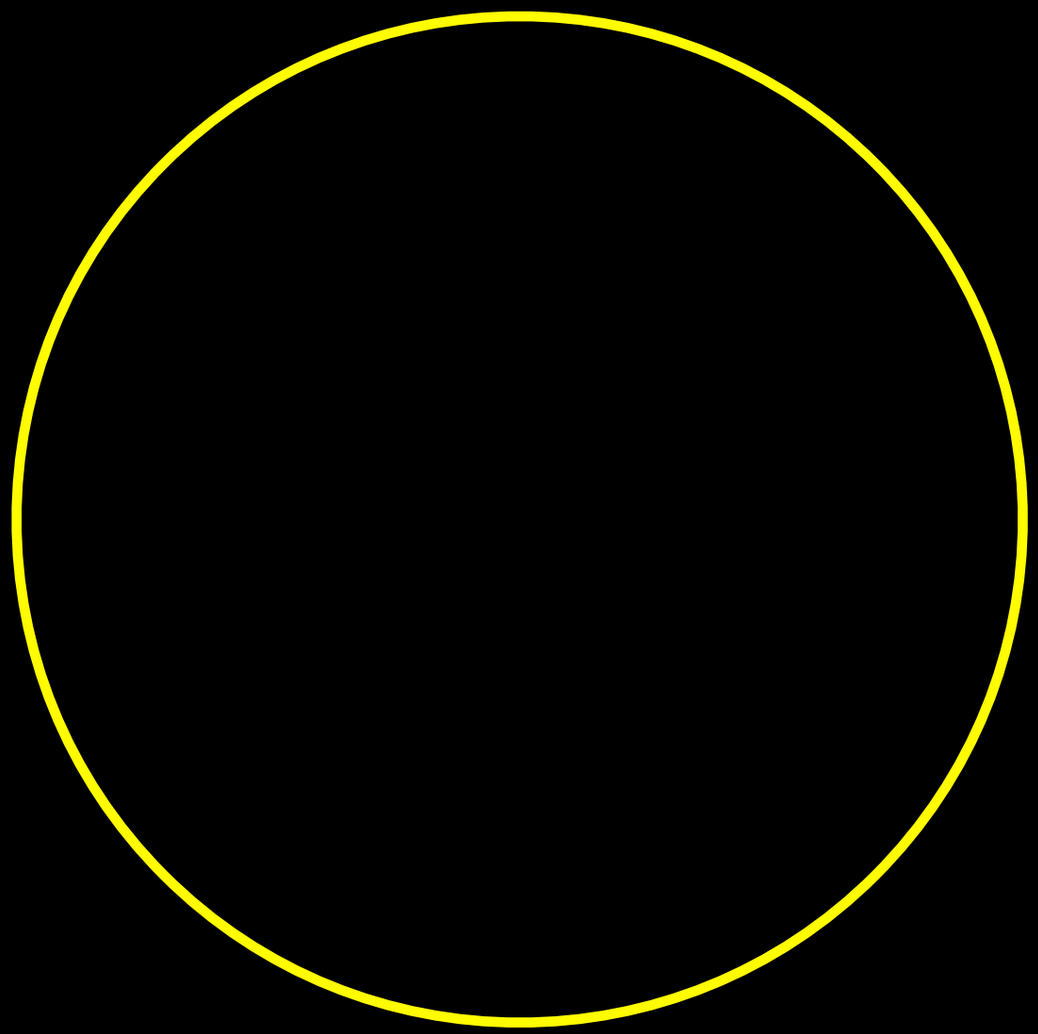
BERKELEY LAB

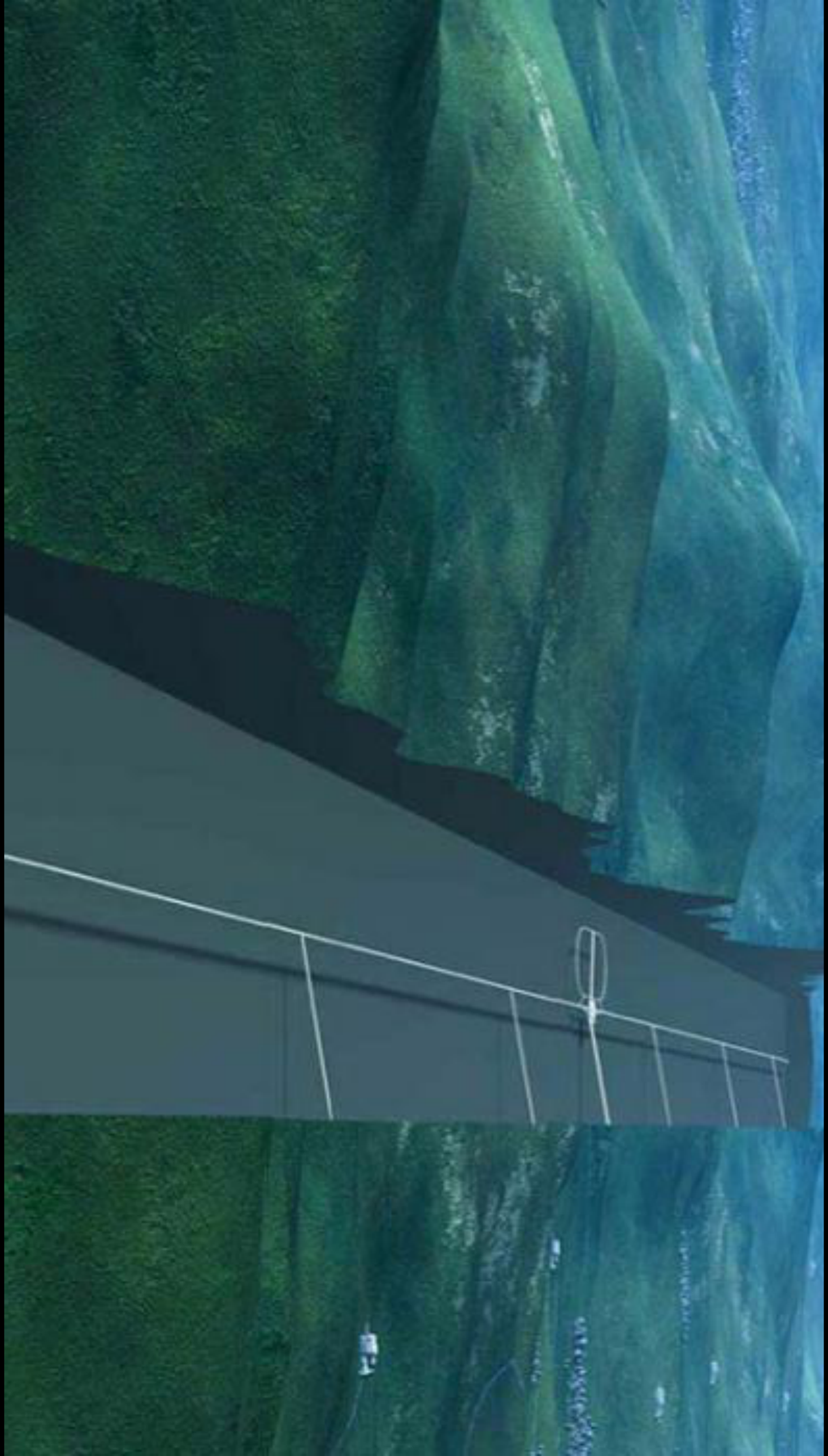
東京大学
THE UNIVERSITY OF TOKYO

UTIAS
東京大学国際高等研究所
THE UNIVERSITY OF TOKYO

KAVLI IPMU
INSTITUTE FOR THE PHYSICS AND MATHEMATICS OF THE UNIVERSE







Credit: **ILC**/**Rey**.Hori

Credit: **ILC**/**Rey**.Hori

Why linear & SCRF?

- Energy Upgrade
  - once there is a linear tunnel, we can extend it and/or put in new technology
- Polarization
  - longitudinal polarization is preserved in LINAC
- efficiency (power consumption)
  - superconducting cavity

Circular

Circular

$$\mathcal{L} = \frac{1}{4\pi} \frac{N^2 f}{\sigma_x \sigma_y}$$

Circular

- circular machines limited by synchrotron radiation

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- Energy loss per turn $\propto E^4/R$

$$\mathcal{L} = \frac{1}{4\pi} \frac{N^2 f}{\sigma_x \sigma_y}$$

$$\Delta E = c_\gamma \frac{E^4}{R}$$

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$$c_\gamma = \frac{4\pi}{3} \frac{\alpha \hbar c}{(m_e c^2)^4} = 8.86 \times 10^{-5} \mathrm{m\ GeV}^{-3}$$

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$$\mathcal{L} = \frac{1}{4\pi} \frac{N}{\sigma_x \sigma_y} \frac{P}{c_\gamma} \frac{R}{E^4}$$

Circular

- circular machines limited by synchrotron radiation
- Energy loss per turn $\propto E^4/R$
- LEP2:
  - P~120MW
  - L~10^{32}cm^{-2}sec^{-1}

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- Need much smaller beam spot size (nanobeam) ~x1000

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Circular

- circular machines limited by synchrotron radiation
- Energy loss per turn $\propto E^4/R$
- LEP2:
  - P~120MW
  - L~10^{32}cm^{-2}sec^{-1}
- Need much smaller beam spot size (nanobeam) ~x1000
- still wall plug power is ~300MW

$$\mathcal{L} = \frac{1}{4\pi}\frac{N^2 f}{\sigma_x \sigma_y}$$

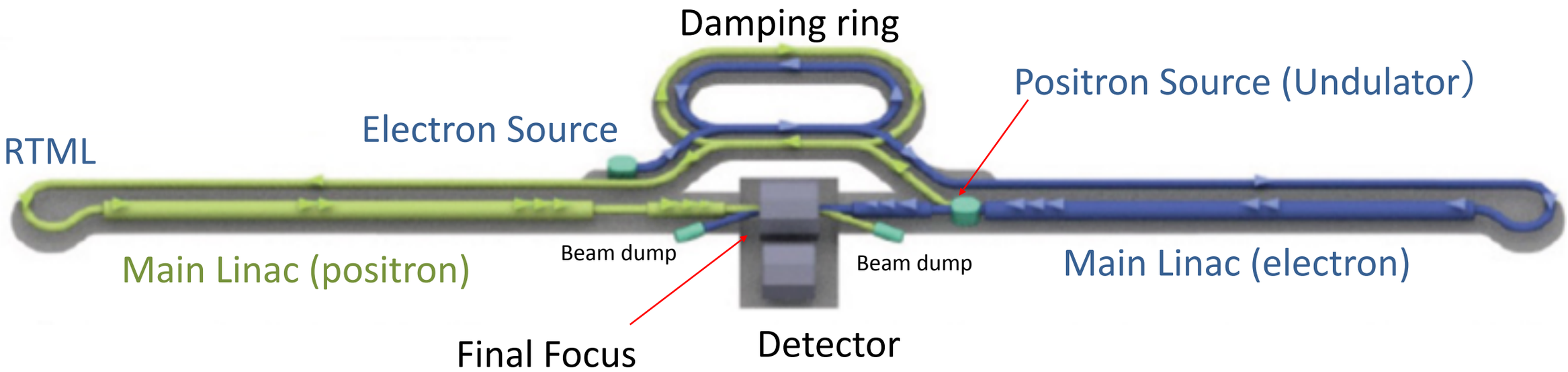
$$\Delta E = c_\gamma \frac{E^4}{R}$$

$$c_\gamma = \frac{4\pi}{3}\frac{\alpha\hbar c}{(m_e c^2)^4} = 8.86 \times 10^{-5}\mathrm{m\ GeV}^{-3}$$

$$P = N f c_\gamma \frac{E^4}{R}$$

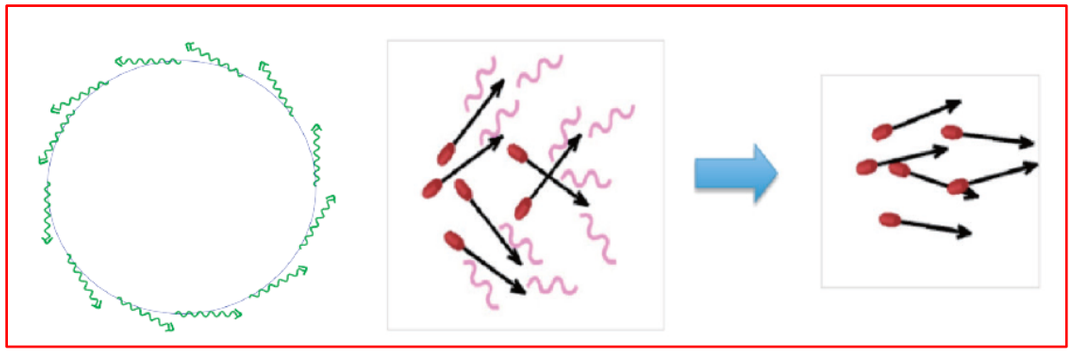
$$\mathcal{L} = \frac{1}{4\pi}\frac{N}{\sigma_x \sigma_y}\frac{P}{c_\gamma}\frac{R}{E^4}$$

ILC area systems



Best performance by combining state-of-the-art technology

- Sources ***Electron/positron***
  - Polarized electron/positron
- High quality beam ***Damping ring***
  - Low emittance beam
    - Small-size
    - Parallel beam
- Beam Transport ***RTML***
  - Bunch compressor
- Beam acceleration ***Main linac***
  - Superconducting RF acceleration
- Beam collision ***Final focus***
  - Nano-meter beam

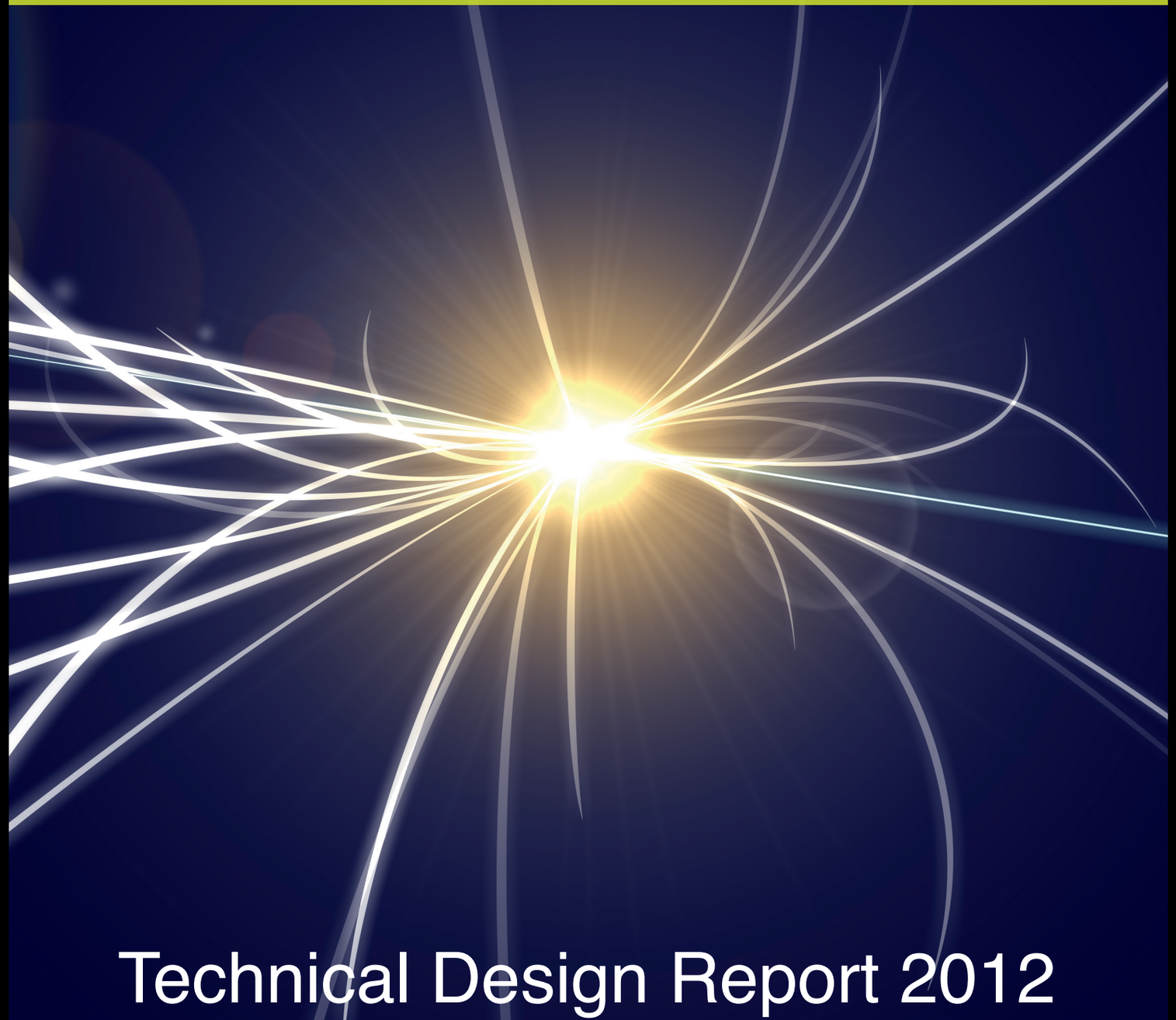


Low emittance beam at damping ring

1.3GH z （L-band) SRF cavity

THE INTERNATIONAL LINEAR COLLIDER

Technical Design Report | Volume 1: Executive Summary



Technical Design Report 2012

Demonstrated ILC accelerator parameters

Parameters	Unit	Required	Design	Demonstrated	Comment
Electron Source					
Bunch charge	nC	**3.2**	4.8	8.0	SLAC-SLC
Beam current	uA	**21**	42	1,000	Jlab
Polarity	%	**80**	80	90	U.Nagoya, SLAC,KEK
Positron Souce					
Bunch charge	nC	**3.2**	4.8	8.0	SLAC-SLC
Polarity	%	**30**	30	80	SLAC E166
Superconducting RF					
Module gradient	MV/m	**31.5 (+/- 20%)**		～31.5	
Cavity Q value （Q_0）		**10^{10}**		**～10^{10}**	DESY, FNAL, JLab, Cornell, KE
Cavity gradient	MV/m	**35 (±20%)**		33.4 MV/m	
Beam current	mA	**5.8**		> 5.8	DESY, KEK
Number of bunches		**1312**		1312	DESY
Bunch charge	nC	3.2		3	
Bunch interval	ns	554		333	
Beam pulse width	μs	**730**		800	DESY, KEK
RF pulse width	ms	**1.65**		1.65	DESY, KEK, FNAL
Repetition	Hz	**5**		10	DESY
Nano-beam					
ATF-FF beam size (y)	nm	**37**		41 at ATF (@ 1.3 GeV)	ATF hosted at KEK
ILC-FF beam size(y)	nm	**7.7**			

Most of the parameters are already demonstrated at the various facilities.

S. Michizono, LCWS 2018 @ Arlington

KEK
High Energy Accelerator Research Organization

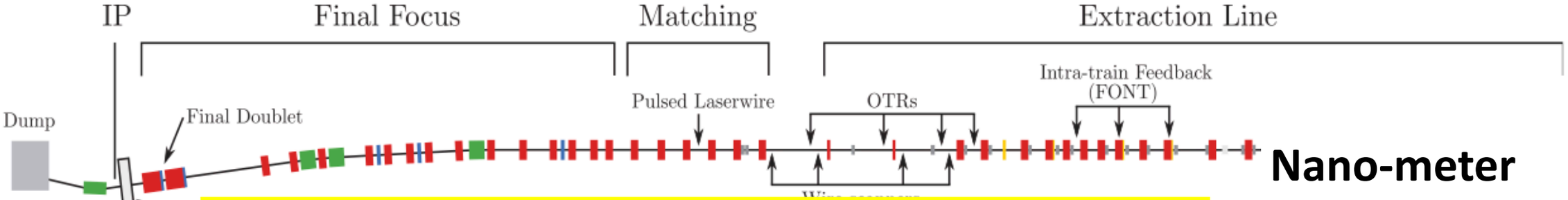
Progress in FF Beam Size and Stability at ATF2

Goal 1: Establish the ILC final focus method with same optics and comparable beamline tolerances

- ATF2 Goal : **37** nm → ILC **6** nm
  - Achieved **41 nm** (2016)

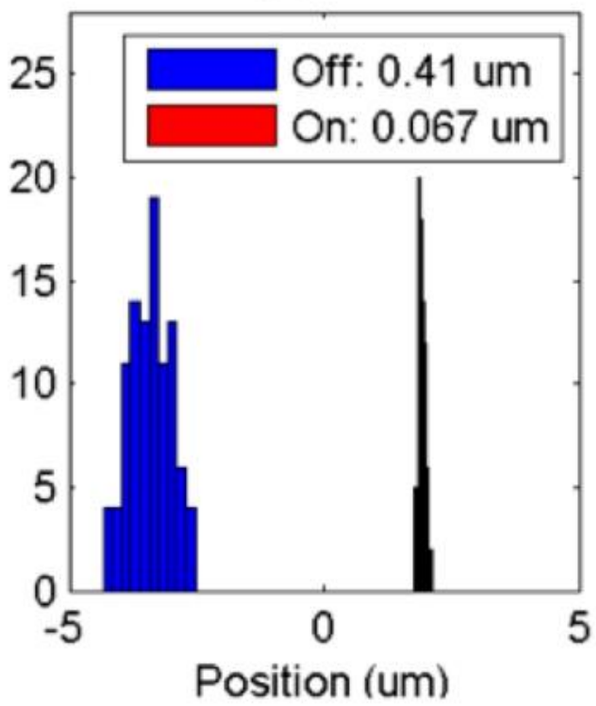
Goal 2: Develop a few nm position stabilization for the ILC collision

- **FB latency 133 nsec achieved** (target: < 300 nsec)
- **positon jitter at IP: 410 → 67 nm (2015)** (limited by the BPM resolution)

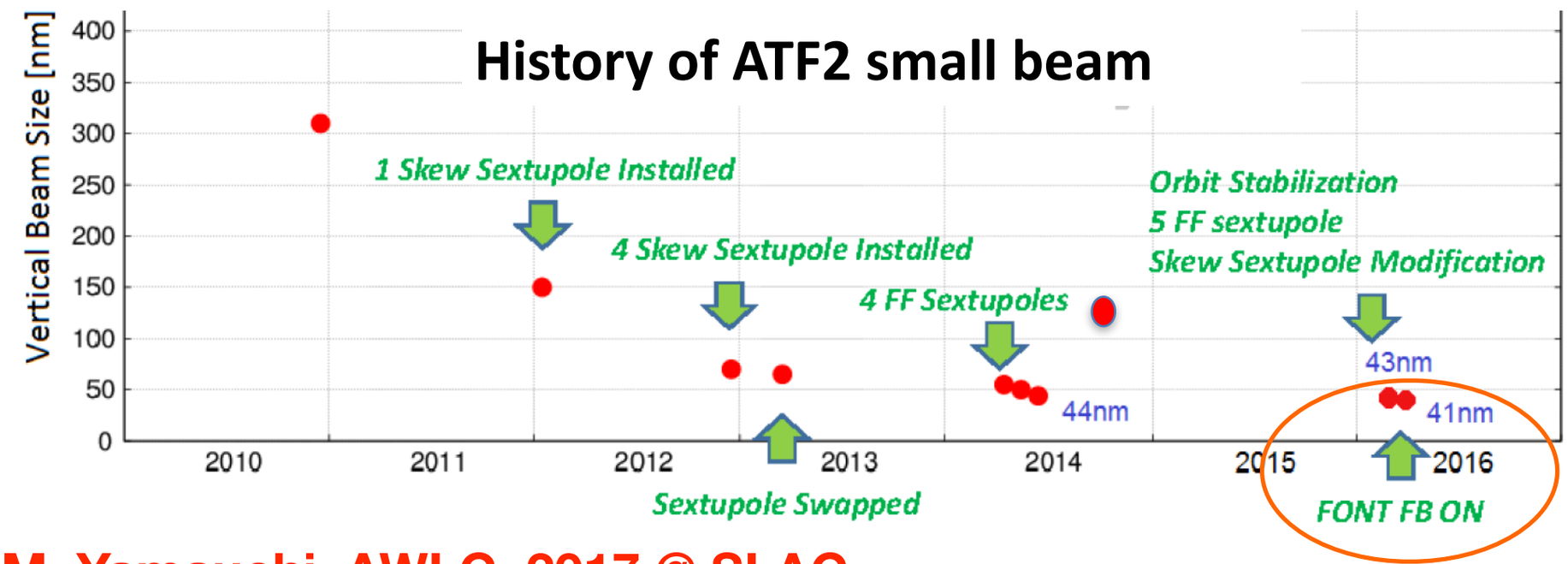


We continue efforts to achieve goal 1 and goal 2.

Nano-meter stabilization at IP



History of ATF2 small beam



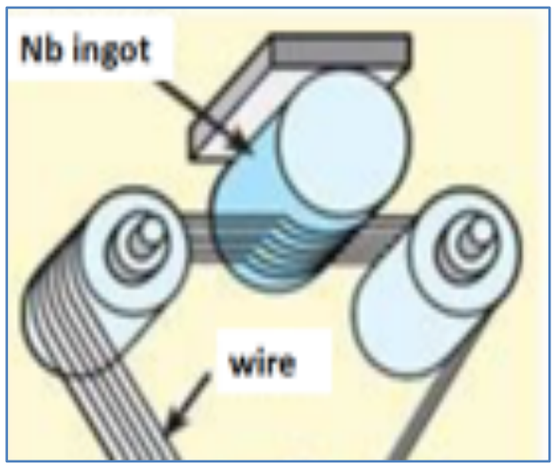
M. Yamauchi, AWLC 2017 @ SLAC

ILC Cost-Reduction R&D in US-Japan Cooperation on SRF Technology

Based on recent advances in technologies;

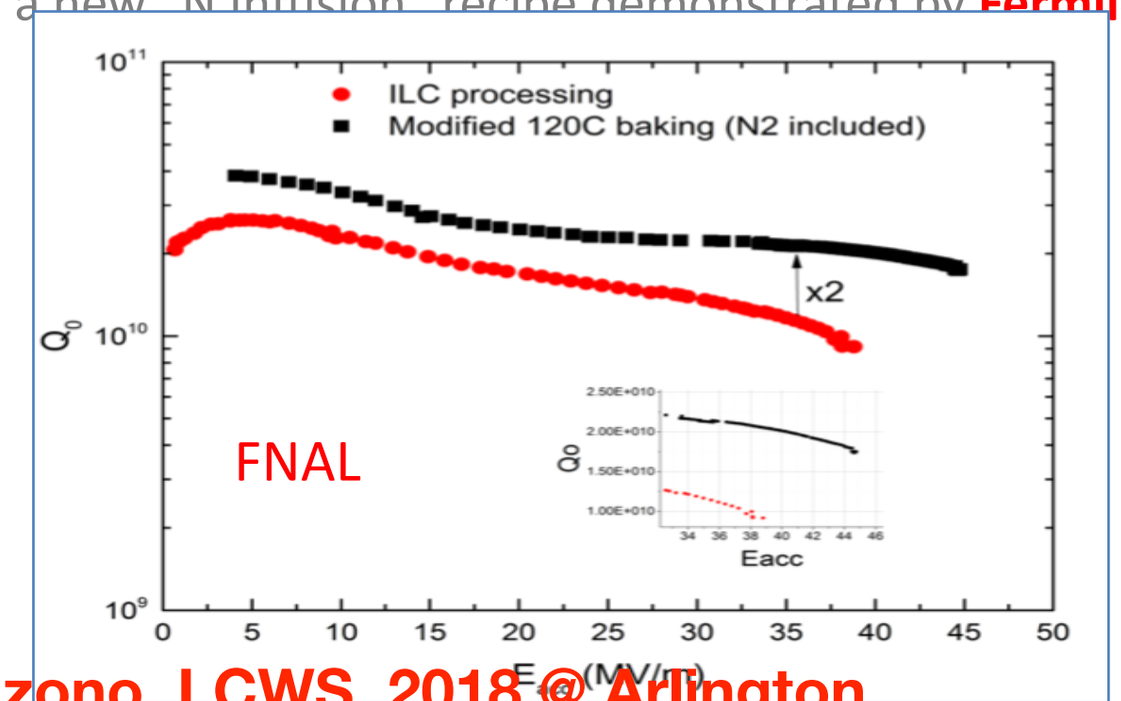
– Nb material/sheet preparation

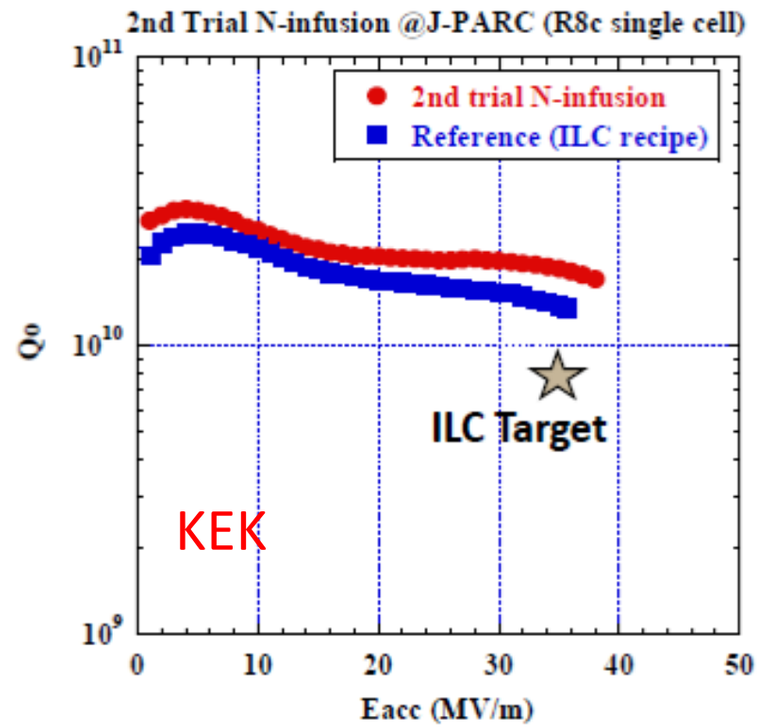
- w/ optimum Nb purity and clean surface



– SRF cavity fabrication for high-Q and high-G

-w/ a new "N Infusion" recipe demonstrated by **Fermilab**





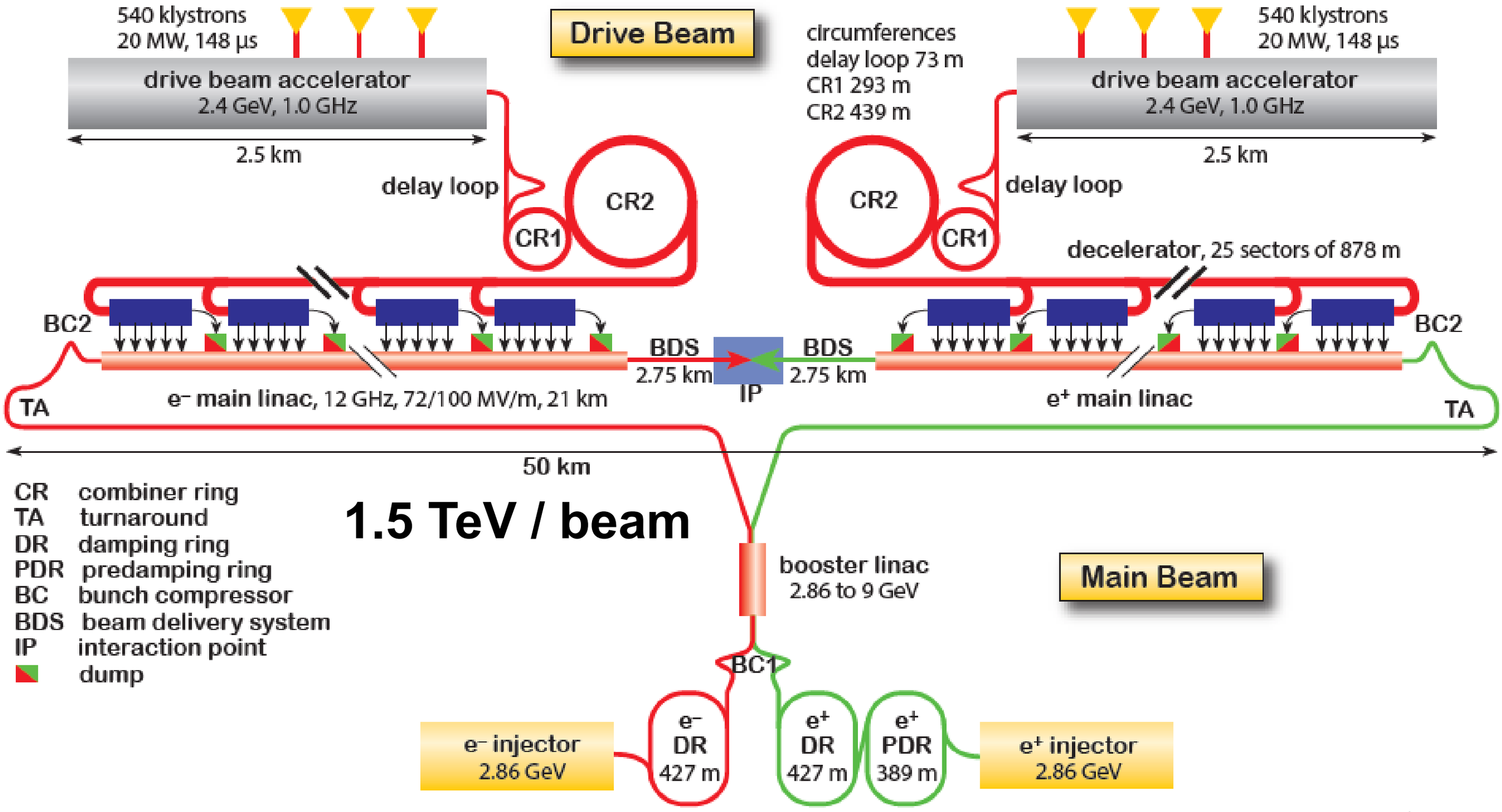
S. Michizono, LCWS 2018 @ Arlington

European X-FEL ~10% prototype of ILC

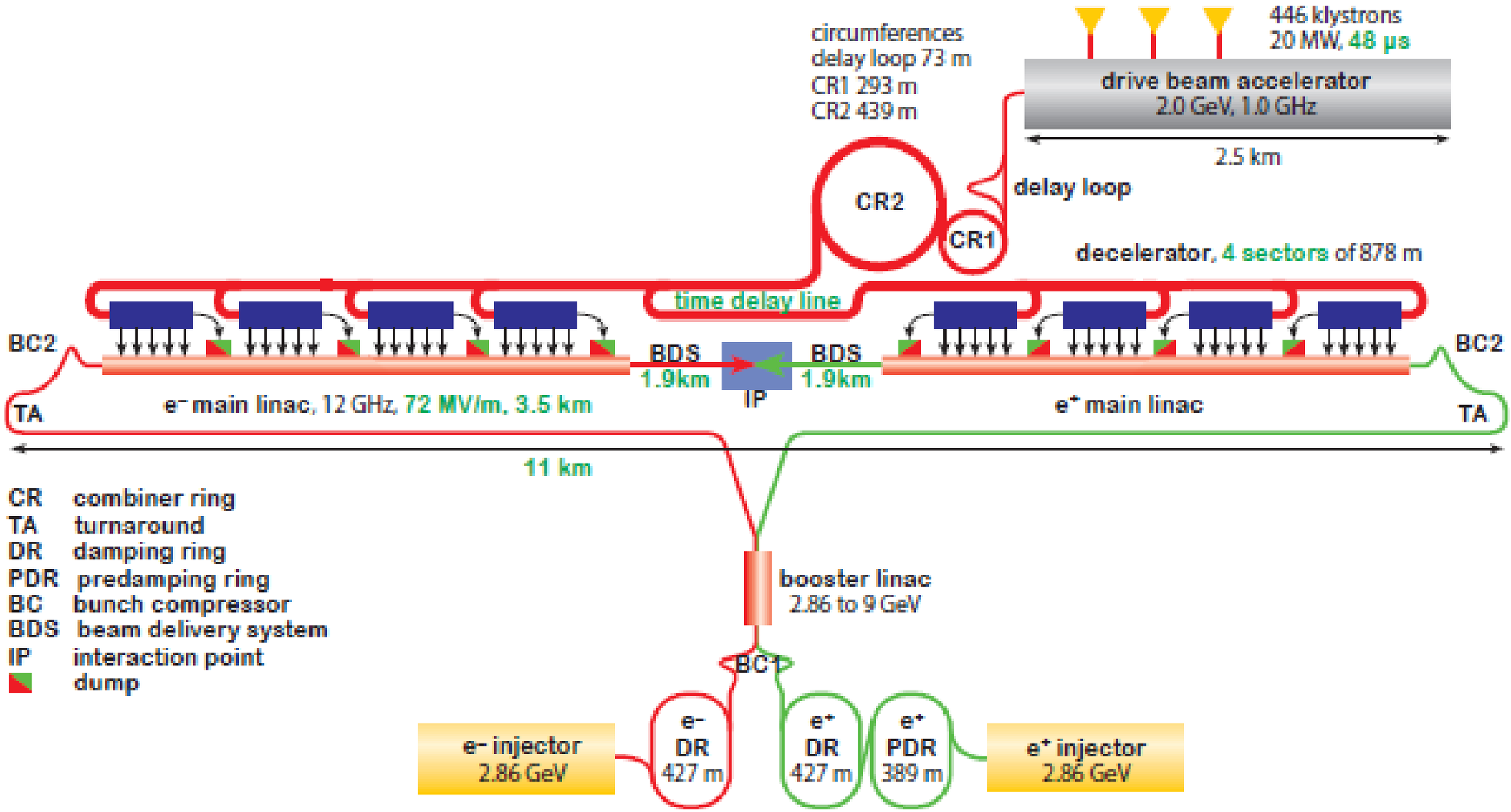
future upgrades

ILC	35MV/m	0.5TeV 1TeV
CLIC	100MV/m	3TeV
PWFA	1GV/m	10TeV

CLIC layout (3 TeV)



CLIC layout 380 GeV



Staged CLIC Project

Optimize machine design w.r.t. cost and power for a staged approach to reach multi-TeV scales:

~ 380 GeV (optimised for Higgs + top physics)
~ 1500 GeV
~ 3000 GeV

Adapting appropriately to LHC + other physics findings

Possibility for first physics no later than 2035

Project Plan to include accelerator, detector, physics

CLIC design parameters

Parameter	Symbol	Unit	Stage 1	Stage 2	Stage 3
Centre-of-mass energy	$\sqrt{s}$	GeV	380	1500	3000
Repetition frequency	f_{rep}	Hz	50	50	50
Number of bunches per train	n_b		352	312	312
Bunch separation	Δt	ns	0.5	0.5	0.5
Pulse length	τ_{RF}	ns	244	244	244
Accelerating gradient	G	MV/m	72	72/100	72/100
Total luminosity	$\mathscr{L}$	$10^{34}\,\text{cm}^{-2}\text{s}^{-1}$	1.5	3.7	5.9
Luminosity above 99% of $\sqrt{s}$	$\mathscr{L}_{0.01}$	$10^{34}\,\text{cm}^{-2}\text{s}^{-1}$	0.9	1.4	2
Main tunnel length		km	11.4	29.0	50.1
Number of particles per bunch	N	10^9	5.2	3.7	3.7
Bunch length	σ_z	μm	70	44	44
IP beam size	σ_x/σ_y	nm	149/2.9	$\sim$ 60/1.5	$\sim$ 40/1
Normalised emittance (end of linac)	$\varepsilon_x/\varepsilon_y$	nm	920/20	660/20	660/20
Normalised emittance (at IP)	$\varepsilon_x/\varepsilon_y$	nm	950/30	—	—
Estimated power consumption	P_{wall}	MW	252	364	589

Compact Linear Collider (CLIC)

- **380 GeV** - 11.4 km (CLIC380)
- **1.5 TeV** - 29.0 km (CLIC1500)
- **3.0 TeV** - 50.1 km (CLIC3000)

LHC

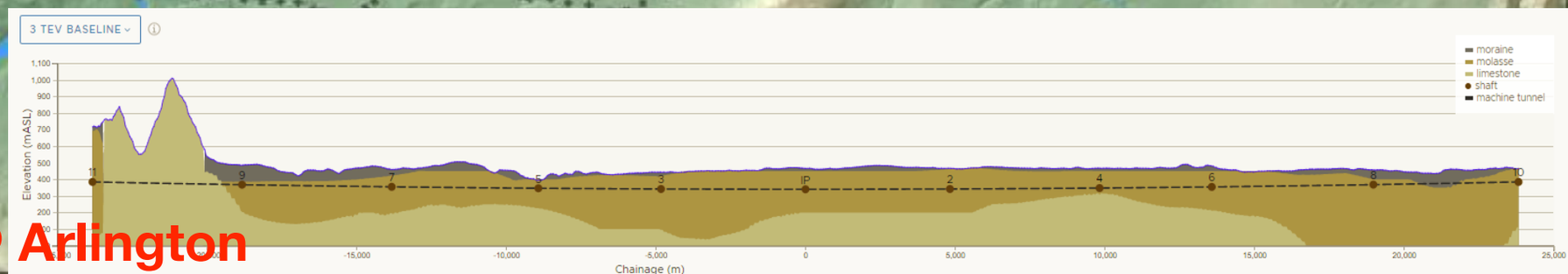
CLIC380

CLIC1500

CLIC3000

CERN

Geneva



P. Burrows, LCWS 2018 @ Arlington

LINEAR COLLIDER COLLABORATION

CLIC roadmap

2013 - 2019 Development Phase

Development of a Project Plan for a staged CLIC implementation in line with LHC results; technical developments with industry, performance studies for accelerator parts and systems, detector technology demonstrators

2020 - 2025 Preparation Phase

Finalisation of implementation parameters, preparation for industrial procurement, Drive Beam Facility and other system verifications, Technical Proposal of the experiment, site authorisation

2026 - 2034 Construction Phase

Construction of the first CLIC accelerator stage compatible with implementation of further stages; construction of the experiment; hardware commissioning

2019 - 2020 Decisions

Update of the European Strategy for Particle Physics; decision towards a next CERN project at the energy frontier (e.g. CLIC, FCC)

2025 Construction Start

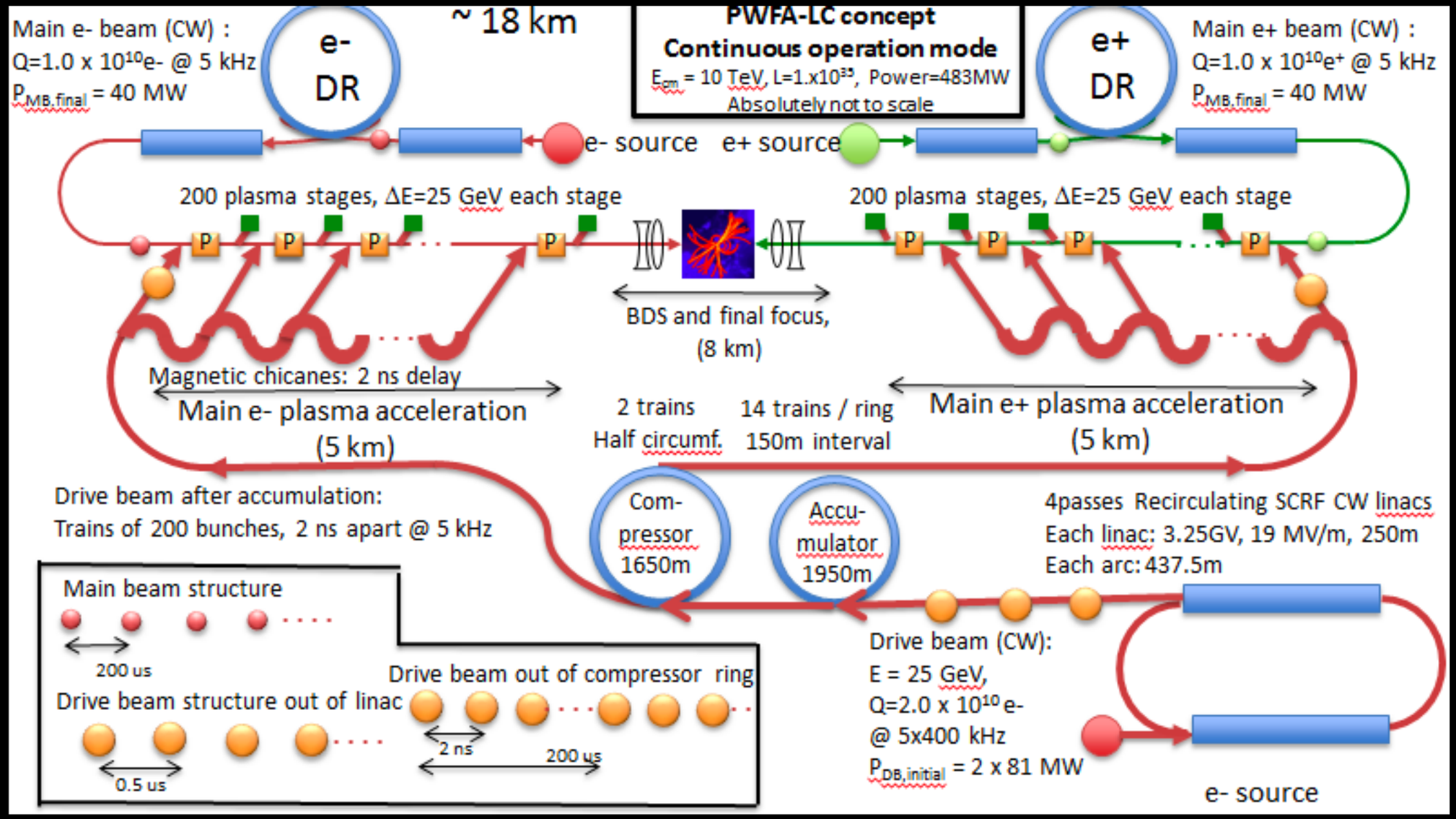
Ready for construction; start of excavations

2035 First Beams

Getting ready for data taking by the time the LHC programme reaches completion

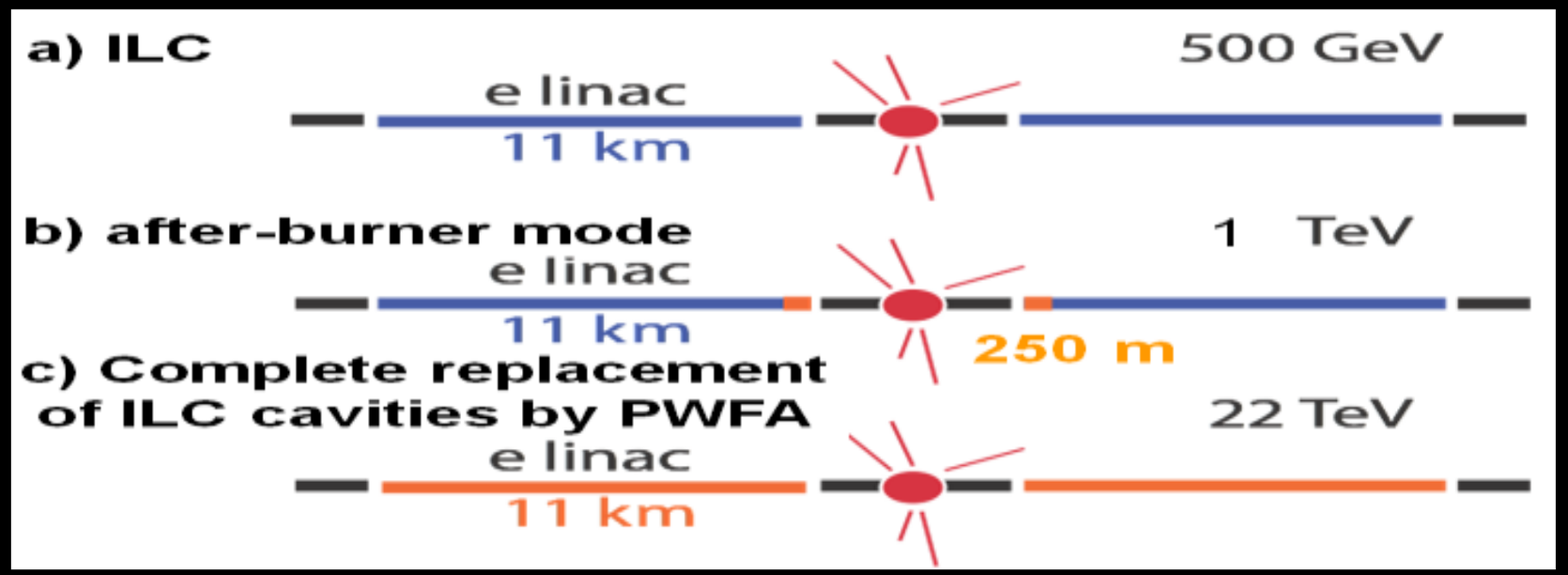
P. Burrows, LCWS 2018 @ Arlington

Plasma Wakefield



Delahaye et al, IPAC 2014

Parameter	Unit	ILC	ILC	ILC + PWFA
Energy (cm)	GeV	500	1000	PFWA = 500 to 1000
Luminosity (per IP)	$10^{34}cm^{-2}s^{-1}$	1.5	4.9	2.6
Peak (1%)Lum(/IP)	$10^{34}cm^{-2}s^{-1}$	0.88	2.2	1.3
# IP	-	1	1	1
Length	km	30	52	30
Power (wall plug)	MW	128	300	175
Lin. Acc. grad.(p/eff)	MV/m	31.5/25	36/30	7600/1000
# particles/bunch	10^{10}	2	1.74	0.66
# bunches/pulse	-	1312	2450	2450
Bunch interval	ns	554	366	366
Pulse repetition rate	Hz	5	4	15
Beam power/beam	MW	5.2	13.8	13.8
Norm Emitt (X/Y)	$10^{-6}/10^{-9}$radm	10/35	10/30	10/30
Sx, Sy, Sz at IP	nm,nm,μm	474/5.9/300	335/2.7/225	286/2.7/20
Crossing angle	mrad	14	14	14
Av # photons	-	1.70	2.0	0.7
δb beam-beam	%	3.89	9.1	9.3
Upsilon	-	0.03	0.09	0.52

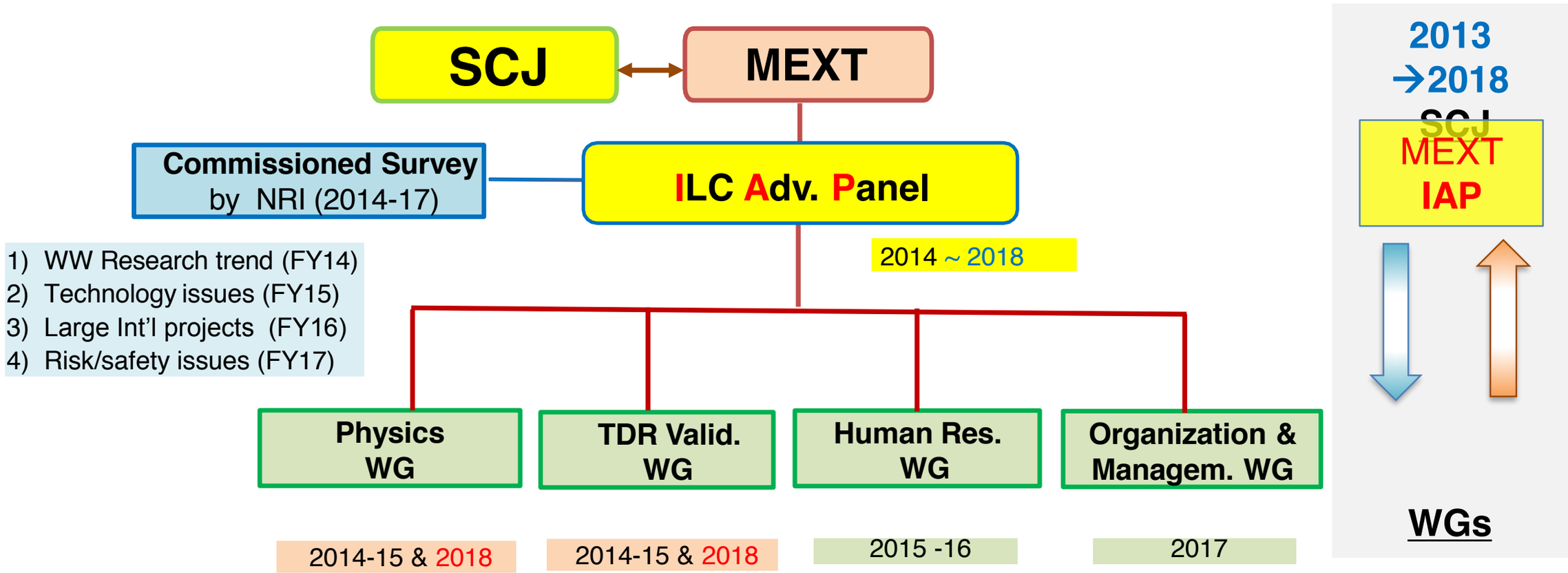


Delahaye et al, IPAC 2014

Colliding beam energy, CM	GeV	250	500	1000	3000	10000
N, experimental bunch		1.0E+10	1E+10	1.0E+10	1.0E+10	1.0E+10
Main beam bunches / train		1	1	1	1	1
Main beam bunch spacing,	nsec	3.33E+04	5.00E+04	6.67E+04	1.00E+05	2.00E+05
Repetition rate,	Hz	30000	20000	15000	10000	5000
n exp.bunch/sec,	Hz	30000	20000	15000	10000	5000
Beam power / beam at IP	W	6.0E+06	8.0E+06	1.2E+07	2.4E+07	4.0E+07
Effective accelerating gradient	MV/m	1000	1000	1000	1000	1000
Overall length of each linac	m	125	250	500	1500	5000
BDS (both sides)	km	2.00	2.50	3.50	5.00	8.00
Overall facility length	km	2.25	3.00	4.50	8.00	18.00
Drive beam						
Transfer efficiency drive to main	%	50	50	50	50	50
Drive beam power per beam	MW	12.2	16.2	24.3	48.6	81.0
Drive beam acceleration efficiency	%	39.9	42.0	44.3	45.0	45.3
Main beam acceleration efficiency	%	19.9	21.0	22.1	22.5	22.7
Wall plug to main beam efficiency	%	9.1	10.8	13.1	16.1	17.0
Total wall plug power	MW	132.9	150.4	185.5	301.3	477.9
IP Parameters						
Normalized horizontal emittance	m	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
Normalized vertical emittance	m	3.50E-08	3.50E-08	3.50E-08	3.50E-08	3.50E-08
Horiziontal beam size at IP (1σ)	m	6.71E-07	4.74E-07	3.35E-07	1.94E-07	1.06E-07
Vertical beam size at IP (1σ)	m	3.78E-09	2.67E-09	1.89E-09	1.09E-09	5.98E-10
Bunch length at IP (1σ)	m	2.00E-05	2.00E-05	2.00E-05	2.00E-05	2.00E-05
Disruption parameter, Y		8.44E-02	2.39E-01	6.75E-01	3.51E+00	2.14E+01
delta_B	%	2.75	6.66	12.76	23.10	29.88
ngamma		0.57	0.73	0.88	1.05	1.14
Geometric Lum ($cm^{-2}\ s^{-1}$)		9.41E+33	1.25E+34	1.88E+34	3.76E+34	6.27E+34
Total Luminosity ($cm^{-2}\ s^{-1}$)		1.57E+34	2.09E+34	3.14E+34	6.27E+34	1.05E+35
Luminosity in 1% top energy ($cm^{-2}\ s^{-1}$)		9.41E+33	1.15E+34	1.57E+34	2.51E+34	3.14E+34
Fig. merit:Luminosity/wall plug (10^{31}/MW)		11.8	13.9	16.9	20.8	21.9

Delahaye et al, IPAC 2014

ILC Investigation by SCJ and MEXT



- Physics WG, and TDR Validation WG re-organized to evaluate ILC-250GeV.

IAP report

http://www.mext.go.jp/component/b_menu/shingi/toushin/__icsFiles/afieldfile/2018/09/20/1409220_2_1.pdf

The report collects facts, no opinions, recommendations or advice.

SCJ Schedule

4th main committee: Sep. 11 (Tue.) 10AM-12AM (Closed session)
5th main committee + sub committee: Sep.18 (Tue.) 10AM-12AM
6th main committee: Oct.1 (Mon.) 1PM-4PM
7th main committee+ sub committee: Oct.10 (Wed.) 1PM-4PM (after hearing, move to closed session)
8th main committee+ sub committee: Oct.16 (Wed.) 10AM-12AM (after hearing, move to closed session)

Texas statement (1)

October 26, 2018

Statement on the ILC Higgs Factory

Scientists from all over the world are now gathering together at the International Linear Collider workshop held in Arlington Texas (LCWS2018) with a firm determination to make the ILC a reality. We hereby issue this 'Texas Statement' with unshakable conviction on its scientific case and to express our strong commitment to do whatever necessary for its success.

Texas statement (2)

The ILC is the right experimental facility to lead our understanding of the Universe to a new stage.

The ILC project has been developed by an international collaboration over three decades. We conceived it as the machine to lead the era of particle physics at the Tera scale with the Higgs particle as the centerpiece. The discovery of the Higgs particle by the LHC fixed the needed energy, and we now have a concrete plan for the ILC Higgs factory. Subsequent measurements at the LHC further reinforced the importance of the precision Higgs studies. Based on the findings of the precision Higgs study, the collision energy of the ILC can be upgraded to the optimal energy with reasonable cost. Throughout its period of development, our original motivation has become increasingly clearer and stronger.

Texas statement (3)

The ILC is a source of new innovative technologies.

We also pride ourselves in the technology for the ILC. Global collaboration has made enormous progress in the development of the superconducting acceleration technology, improving its performance by quantum leaps. This technology, developed for the ILC, is now essential, for example, for the current state-of-the-art X-ray and neutron facilities. More innovations broadly benefitting science are in store as we proceed along our path.

Texas statement (4)

This is the time to move forward.

The international community represented by the participants of LCWS2018 is committed to doing anything needed to bring the ILC to its fruition. Once the expression of intention to host the ILC is issued by the Japanese government, we will greatly expand our own efforts and act on our respective governments ever more intensively to help achieve the necessary international agreements. We eagerly await the signal to proceed and, when the ILC start its data taking, we will be there to carry through on its promise.

Lyn Evans
LCC Director
For scientists attending LCWS2018

Address by the Honorable Shintaro Ito, Member of the House of Representatives of Japan

Presented at the International Workshop on Future Linear Colliders, LCWS2018

October 26, 2018

Thank you for the kind introduction, and good morning to those of you attending the Linear Collider Workshop in Arlington, Texas. I hope you can hear me well through the video conference. It is about 11 o'clock in the evening here in Tokyo. I hear many of you often hold remote conferences at such horrible times. But this is indeed the spirit you need in a truly international cooperation like the ILC.

I cannot wait for the day when the ILC is built, so I can welcome you at the ILC site in Tohoku, close to my home. We could share the wonderful research we could enjoy the fun life together in the same time zone. I was not able to come to the workshop because of the parliament's schedule. But I would like to tell you about our recent progress in Japan.

Today, we're standing at an important juncture for the ILC project. The world is waiting for the Japanese government to show the Expression of Interest to host the ILC. We are very much aware the deadline is the end of this year.

Currently, there are many efforts all over Japan. Politicians, administrations, private sectors, and scientific communities are all working at full strength to realize the ILC. I will tell you about our political efforts.

Just last month, the Liberal Democratic Party, created a new organization, called the Liaison Committee for Realizing the ILC. The Liaison Committee brings together various strategic groups involved in making important policies, such as science technology and innovation, regional revitalization, reconstruction from natural disasters, and national resilience. The Federation of Diet Members for the ILC is included in the Liaison Committee, and the Chairperson of the Federation, Mr. Kawamura, is also leading the Liaison Committee. I'm confident to say we're a very strong team.

As the first action, the Liaison Committee formulated our strategy to realize the ILC, by integrating the ILC project across various important policies for Japan. The ILC will surely lead the frontier of science technology and innovation. Furthermore, a large international research lab like the ILC will be the core of revitalizing the regional economy. And it will greatly accelerate the reconstruction efforts following the Great East Japan Earthquake in 2011. We also expect the technological innovations from the ILC will contribute to the overall resilience of the nation against natural disasters. By incorporating the ILC project into these policies, the ILC will effectively become a national priority. We believe now is the time to propose the ILC to the people in Japan.

Another crucial point is the steps toward international agreement for the ILC. We will follow the Critical Decision process and define the conditions necessary for international agreement. We propose the following conditions. For Japan, the ILC should become a top priority in policy making. And the budget has to be secured outside of the ordinary budget for the ministries. Furthermore, we should proceed with official discussions on the ILC with our international partners. We must reach an agreement for a project that everybody interested could join. This includes the cost sharing of the project. The contribution from outside Japan is expected to be roughly half of the total cost.

Once the international agreement is reached, the ILC project will have the official green light. To start the Critical Decision process, the Japanese government must show the Expression of Interest by the end of this year.

The Liaison Committee is already taking steps to realize this strategy. Last week, we met with two newly appointed Ministers in the Fourth Cabinet of Prime Minister Abe. We met with Minister Shibayama from MEXT and Minister Hirai for Science and Technology Policy. We presented to them our strategy for realizing the ILC. We will continue to work with Party members, and the Prime Minister and his Cabinet, so that the Expression of Interest can be delivered in time.

The ILC is also under review at the ministerial level. By request from MEXT, the Science Council of Japan is holding reviews for the ILC. We're expecting their conclusion by the end of this year. As part of our input, the Liaison Committee wrote a letter describing our ILC realizing strategy. We hope the Council will come to their conclusion based on correct information. If I may, I would like to ask you to write letters to the Science Council as ILC experts and express your support for the project. We would really appreciate it if you could do that.

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These efforts in Europe are being greatly facilitated by parliament members, Mr. Stefan Kaufmann from Germany and Mr. Olivier Becht from France. We are currently preparing for their visit to Japan in a few weeks' time to continue our discussions.

We recently made very significant progress with the United States also. On October 10th, we had a very positive meeting with Mr. Paul Dabbar, Under Secretary for Science of DOE. He said, if the Japanese government decides to go forward with the ILC, the DOE will find it very positive, and they will participate and contribute to the project management and technology aspects. He also said, he looks forward to engaging with members of Congress, governmental figures, and others in Washington to get support for the ILC project. We are so happy to receive such an enthusiastic support.

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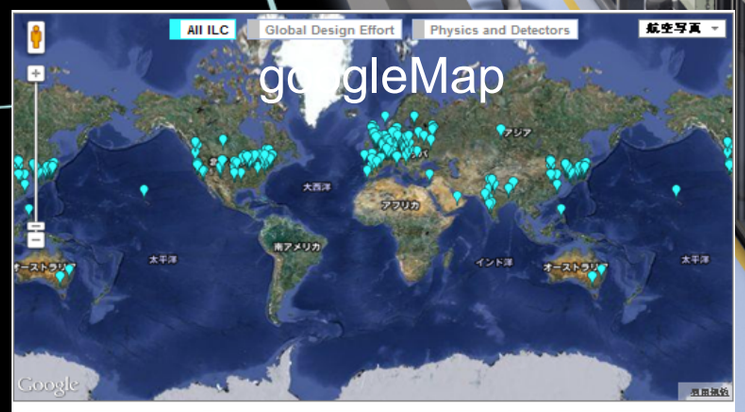
Update on ILC status in Japan



Satoru Yamashita (ICEPP, Univ. of Tokyo)
LCWS2018 @ Arlington, Texas, US
Oct. 22, 2018

Update on political front

July

Preparation of new body for ILC in ruling party LDP (Liberal Democratic Party)

Strengthen cooperation with government core (Prime Minister's office)

Meeting with **Prime Minister Abe**

Sep.

Establish LDP **Coordination Council for Realization of ILC**

Oct.

The LDP Coordination Council meet with US Undersecretary P. Dabbar

September 25, 2017
General Meeting, Federation of Diet Members for ILC

July 5th

Meeting with Prime Minister Abe
July 5th

Prime Minister Abe
Deputy Chief Cabinet Secretary Nishimura
Deputy Chief Cabinet Secretary Nogami
Kawamura (Diet Budget committee chair)
Shionoya (LDP election chair)
Suzuki (Minister of Olympic)
Onodera (Minister of Defense)
Nishioka (AAA chair, MHI former CEO)
Takahashi (Tohoku, Tohoku electric former CEO)
Yamashita

LDP　Liberal Democratic Party　July 4

Launch “ILC association” with president/chairs of
　S&T strategy committee
　HQ of reconstruction of remote area
　HQ of recovery from disaster in 2011
　HQ of strengthening construction

Liberal Democratic Party
Coordination Council for Realization of ILC

Unified HQ for Implementing Regional Revitalization

Head: Hon. Takeo KAWAMURA

HQ for Promoting National Land Resilience

Head: Hon. Toshihiro NIKAI

Research Council for Strategy on Science, Technology and Innovation

Chair: Hon. Kisaburo TOKAI

HQ for Accelerating Reconstruction from Great East Japan Earthquake

Head: Hon. Fukushiro NUKAGA

Research Council for Strategy on Intellectual Property

Chair: Hon. Akira AMARI

Liberal Democratic Party
Coordination Council for Realization of ILC
(Representative: Hon. Takeo KAWAMURA)

(Across-party group) Science and Technology Group

Chair: Hon. Hiroyuki HOSODA

Advanced Accelerator Assoc. Promoting Science and Technology

Chair: Mr. Takashi NISHIOKA

ILC 100 People Committee

Knowledgeable Advisors

Hon. Hiroya MASUDA (former Minister for Internal Affairs)
Prof. Satoshi FUJII (Counselor, Cabinet Secretariat)
Prof. Atsushi SUNAMI (Vice President, GRIPS)

Tohoku ILC Promotion Council

Representative: Mr. Hiroaki TAKAHASHI, Prof. Hideo OHNO

ILC Supporters

(Across-party group) Federation of Diet Members in Support of ILC

Chair: Hon. Takeo KAWAMURA
Secretary General: Hon. Ryu SHIONOYA

Sep. 18 Liberal Democratic Party (LDP)
1st Meeting @ HQ Building

Hon.Amari

Hon.Kawamura

Hon.Nikai
(LDP GD)

Hon.Hosoda

Hon.Nukaga

Hon.Shionoya
Hon. Tokai
Hon. Nakasone
(US-Japan chair)
Hon. Suzuki

Hon.Ito
Hon. Nishimura
Hon. Fujiwara
Hon. Takahashi

Hon.Otsuka

Mr.Nishioka
(AAA, MHI)

Mr.Takahashi
(Tohoku)

KEK
High Energy Accelerator Research Organization

Resolution by the ILC Coordination Council

September 18, 2018

- To position ILC as a cross-policy “national project”, covering not only science, technology and innovation but also many challenges faced by the national government;

- To secure the financial resources for the realization of ILC (beyond the Olympic Games) outside the ordinary science and technology, academic or university budgets; and in addition,

- To make sure that, as for the international agreement of ILC, certain critical decisions, such as the share of oversea investments be roughly half, be satisfied before the international agreement necessary for the start of construction of ILC is reached.

LDP Liberal Democratic Party (Ruling Party)

"Coordination Council for Realization of ILC"

Lead by presidents/chairs of

Research Council for Strategy on Science, Technology and Innovation
Unified HQ for Implementing Regional Revitalization
HQ for Accelerating Reconstruction from Great East Japan Earthquake
HQ for Promoting National Land Resilience
Research Council for Strategy on Intellectual Property

Across-party groups:

Federation of Diet Members in Support of ILC
Science and Technology Group

With supports by

- **Knowledgeable Advisors：**
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- **ILC Supporters**
- **ILC 100 People Committee**

July 4th
Preparatory Meeting

↓

Sep. 18
The 1st Meeting
→ Resolution

↓

Oct. 10
2nd Meeting
With **US DoE Undersecretary P. Dabbar**

↓

Oct. 17
Meeting with Minister of S&T, Minister of MEXT

↓

Boosting actions

US-Japan
(2013 -)

OSTP director (2014) @ Washington DC

Germany-Japan (2016-)

France-Japan (2016-)

S. Yamashita, LCWS 2018 @ Arlington

Washington DC, May 1-3, 2017

S. Yamashita, LCWS 2018 @ Arlington

wonderful meeting with P. Dabbar
Very proactive, clear and positive on ILC

Undersecretary P. Dabbar

Members of LDP Council for ILC

Report will be made by Hon. Ito
On 26th at LCWS2018

Oct. 10th
@ Diet office building Special meeting room

P. Dabbar visited KEK on 9th of Oct.

S. Yamashita, LCWS 2018 @ Arlington

Paul Dabbar @ScienceUnderSec · Oct 15

Enjoyed my meeting at the Diet's Tokubetsu-shitsu with former ministers & current Diet members. Thanks for taking the time out of your schedules to explain the current support for ILC & the long history of collaboration between @doescience & the Japanese scientific community.

9 18

Paul Dabbar @ScienceUnderSec · Oct 15

Thanks to the @kek_en staff for your hospitality. Enjoyed seeing the Belle II Detector, the Accelerator Test Facility, and hearing the latest on International Linear Collider.

5 24

High Energy Accelerator Research Organization

MEXT discussed ILC with European Governments

- A group of MEXT officials led by Deputy Director of Research Promotion Bureau, MEXT, had a video meeting with French MESRI on March 16.

- “Given the results of LHC, feeling among researchers in France is that 500GeV ILC will not be able to find signs of new physics beyond Standard Model. 250GeV ILC now has a certain scientific merit, because it can make clear precision measurements of the Higgs particle. In general, it is necessary to balance cost of the project with its expected scientific outcome.”

- “For the large research infrastructure, MESRI has its own decision making process, based on the prioritization given by the domestic scientific community. Possible French contribution to ILC will have to be considered in this process.”

Y. Yamauchi, LCWS 2018 @ Arlington

High Energy Accelerator Research Organization

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- A group of MEXT officials led by Deputy Director of Research Promotion Bureau, MEXT, had a video meeting with German BMBF on May 9.

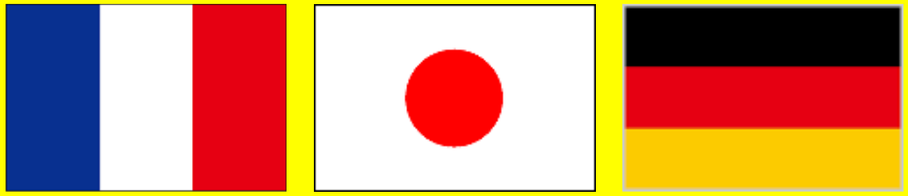
- “German researchers have scientific interests in the ILC project, however there is a prudent opinion that the change from 500GeV to 250GeV will restrict the project’s capability, and that it is, therefore, questionable whether it will really open up the way to new physics.”

- “It is a problem that in past cases, the initial cost estimate of a large-scale project often turned out to be quite different from the actual cost, causing unexpected additional cost. In addition, professional project management based on past experience and know-how is required to commission and operate such a large scale project.”

- “For the large research infrastructure, German Government has its own decision making process, based on the prioritization given by the domestic scientific community. Possible German contribution to ILC will have to be considered in this process.”

Y. Yamauchi, LCWS 2018 @ Arlington

1st Japanese Delegation (Parliament, Ministries, Industry, Local, Researchers) to Europe



Visit to Paris and Berlin （2018.1.9～1.11）

2018.1.08 and 1.12 visit CERN

Germany/France side

Leading Part: Hon. Becht (France) Hon. Kaufmann (Germany)
Hon. Trautmann (EU/Strasbourg)

True Heroes: Marc Winter Maxim Titov

Supervision: Rolf Heuer Joachim Mnich

EU-Japan federation meeting, France Mar. 3-4, 2015

IPU Conference in Zambia Mar. 19th-23rd, 2015

Hon. Shun-ichi Suzuki

Japanese Diet members led by the late Hon. Kenji Kosaka

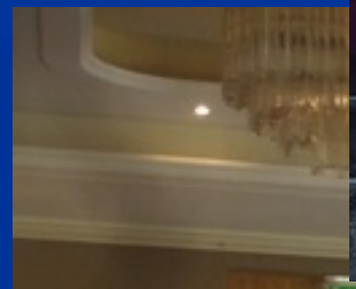
Meeting with German Bundestag members, October 2016

S. Yamashita, LCWS 2018 @ Arlington

IEEE Oct. 2016 & LCWS2017 Oct. 2017 @ Strasbourg

Mrs. Catherine Trautmann
Vice-présidente, Strasbourg Eurométropole
Former French Minister of Culture
Former EU Parliament member
Former Mayor of Strasbourg

AAA Chairman
T. Nishioka



Two Diet members participated and discussed on ILC

@EU-Japan
VIP meeting
Hon. Ito

S. Yamashita, LCWS 2018 @ Arlington

The first step

LCWS2017 in Strasbourg (October 27th)

From Europe

Hon. Olivier BECHT (National Assembly, France)

Hon. Stefan KAUFMANN (Bundestag, Germany)

From Japan (ILC Federation of Diet Members, remote)

Hon. Takeo Kawamura

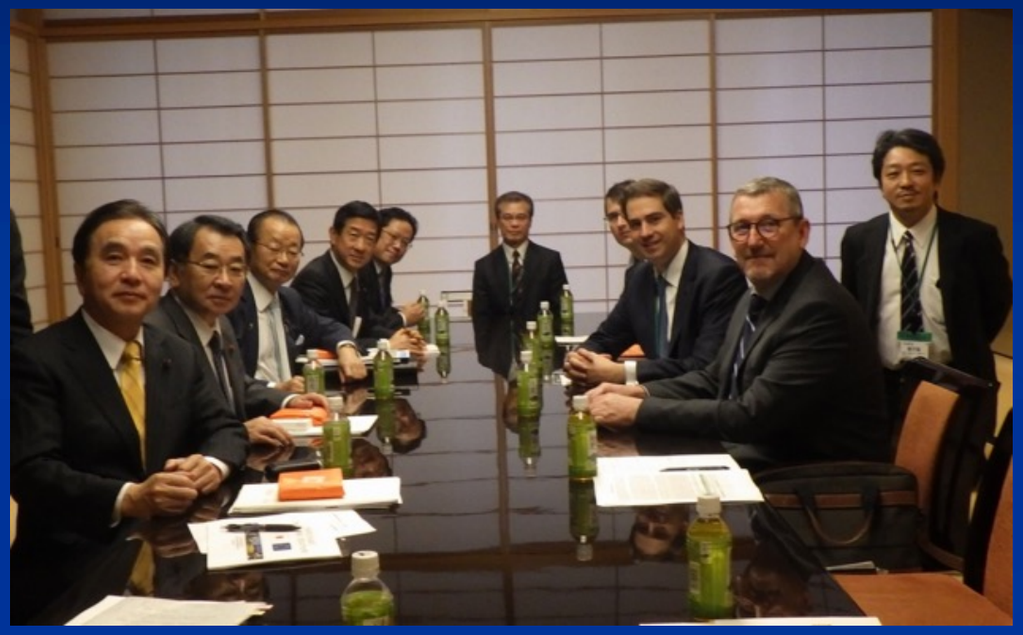
Hon. Ryu Shionoya

Hon. Tatsuo Hirano

France-Japan Meeting on ILC

(Tokyo, 2017 Nov 29)

The second step



Japan:
Hon. Kawamura, Hon. Shionoya, Hon. Hirano,
Hon. Ito, Hon. Otsuka, Hon. Fujiwara
MEXT: Mr. Itakura et al
Members of AAA, Tohoku Economy Federation
Researchers
France:
Hon. Olivier Becht
Mr. Jean-Christophe AUFFRAY（French Embassy)
Mr. Aurelien ANTHONY（Alsace Japan Agency)
etc.

Japanese Delegation

A big jump

Date: January 9-11, 2018
Meetings@Paris: National Parliament, MESRI, Laboratories
Meetings@Berlin: Bundestag, BMBF

Federation of Diet Members: Hon. Shionoya, Hon. Ito, Hon. Otsuka
Policy secretary of Hon. Kawamura

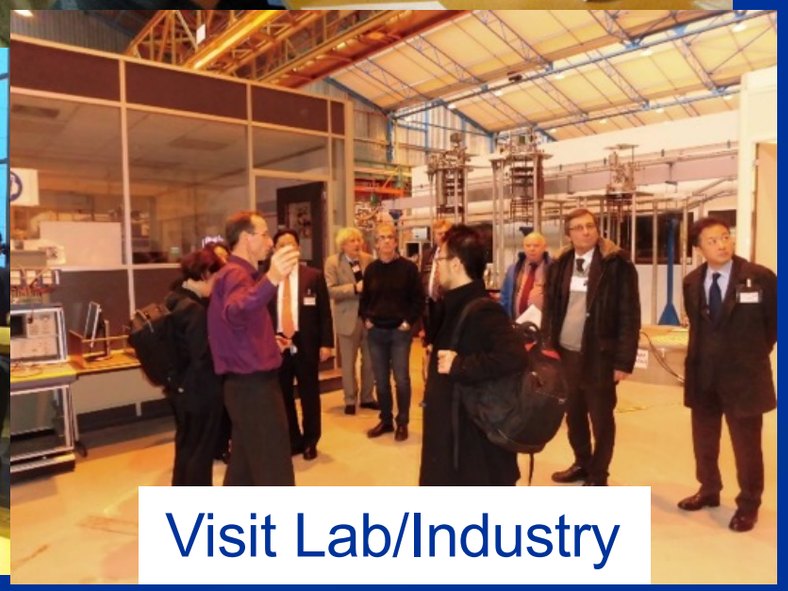
Ministry: Mr. Itakura (MEXT) Deputy Director-General of Research Bureau,
Officers of Japanese Embassy in Paris/Berlin (Ministry of Foreign Affairs)

AAA : T. Nishioka (former MHI President),
J. Nishiyama, T. Sakamoto, M. Matsuoka

Tohoku Economy Federation:
H. Takahashi (former President of Tohoku Electric Power),
O. Oe, G. Sato, E. Nishiyama

Researchers : A. Suzuki (Iwate-pref), H. Aihara (Tokyo), S. Yamashita (Tokyo)
N. Niita (KEK, International Affairs Division)

Hon. TOURRET, Hon. BECHT



Visit Lab/Industry

Counterparts between France and Japan are established at four levels:

1. Parliament and Diet
2. Ministries
3. F. A. /Laboratories
4. Researchers

Meetings at Palais Bourbon, Government building, and Laboratories

Counterparts between Germany and Japan are established at four levels:

1. Bundestag and Diet
2. Ministries
3. F. A. /Laboratories
4. Researchers

BMBF, Germany

Hon. Kaufmann

Dr. Schuette

Conditions for ILC realization from French/German Governmental point of views

1. ILC in the result of the next European Strategy of Particle Physics
2. Co-prosperity with CERN for long
3. Industrial Participation from each partner country

Counterpart in each of 5 layers
1. Parliament Level
2. Ministry Level
3. Funding Agency – Laboratory Level
4. Working researchers (Liaisons)
5. Industry Level

Hon. Olivier BECHT visit Japan in May

May 16 @ TOHOKU　with Governor of Iwate prefecture, Mayors, Economy bodies

May 17 @ TOKYO　with Diet members, opinion leaders, industry, researchers

May 23 @ TOKYO (MHI) with Chair of Advanced Accelerator Association (AAA)

Gave BIG and WONDERFUL IMPRESSION to Japanese VIP's

+

Facilitate clear recognition of Urgency and Necessity of Japanese Gov's Clear signal in time in 2018

+

Hints on protocol and processes to realize the signal in time from Japan.

S. Yamashita, LCWS 2018 @ Arlington

Update since LCWS2017 to LCWS2018

Update on Ministry processes
MEXT ILC advisory panel → opinion of Science Council of Japan
Need your actions!

Update on supports by public Getting visible
Industry sectors (AAA) Excellent
Regional Activities in Tohoku site area Excellent
ILC supporters, Medias, ILC 100 people committee Excellent
Excellent S. Glashow & B. Barish in Tokyo, messages to public, PM, Ministers

Update on Actions in Diplomatic front Excellent
US DoE Undersecretary for science P. Dabbar (Oct. 10@Tokyo)
France (Parliament members, MESRI, ,, Jan. @Paris) Excellent
Germany (Parliament member, BMBF, ,, Jan. @Berlin) Excellent

Update on Actions in Political front Excellent
Ruling Party (Liberal Democratic Party) new body for ILC Excellent
Coordination Council for Realization of ILC (Sep.2018-)
Meeting with Prime Minister (July) and to be made again soon Excellent

High Energy Accelerator Research Organization

Summary and conclusions

- The ILC proposal is being intensively studied by the ILC Panel at the Science Council of Japan. KEK and Japanese HEP community are making all the possible reactions to the questions given by the Panels, so that the ILC is correctly understood by them.

- We anticipate that a report will be given by the Panel in ~ a month.

- Japanese Politicians organized the ILC Coordination Council, which published a resolution and push the project strongly.

- Statement from the Japanese government is expected by the end of 2018. Outcome from the SCJ + Result of the political efforts = Governmental statement from Japan.

Y. Yamauchi, LCWS 2018 @ Arlington