ilc newsline

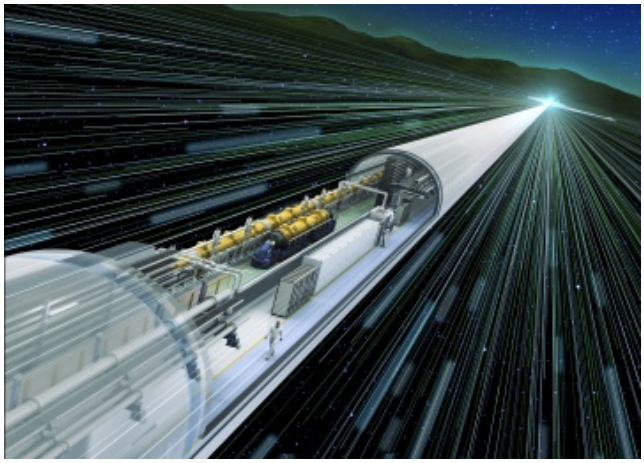
Reconstructed 2026-10-23 from the saved issue layout and available article content.

18 DECEMBER 2025

DIRECTOR'S CORNER

IDT Activities and Outlook- Summarising the 2025 activities by the IDT and anticipating what's to come

by Tatsuya Nakada



From finalising the ILC cost update to shaping the European Strategy for Particle Physics, the IDT has played a key role in major developments this year. With critical decisions on the horizon, the coming months will be decisive for the future of linear colliders.

FEATURE

First Reflections on the Recommendations of the European Strategy Group

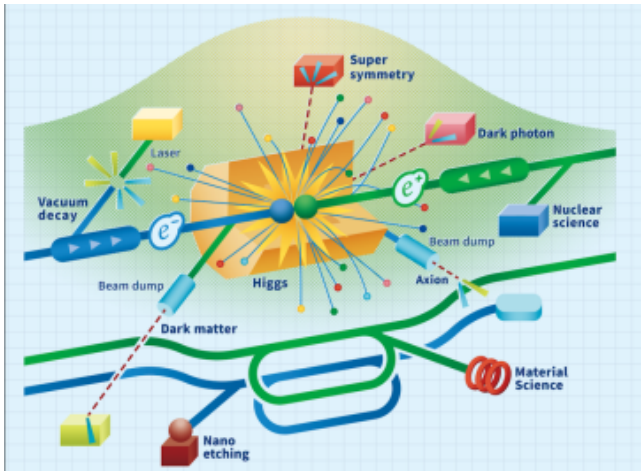
by Jenny List, Tatsuya Nakada and Steinar Stapnes



The recently released recommendations of the European Strategy Group discuss Linear Colliders as technologically mature flagship projects which offer a competitive science program in Higgs and Top physics, while not ranking alternative projects beyond the FCC-ee. The next steps for Linear Colliders will be discussed at the LinearCollider@CERN Workshop in early January.

ANNOUNCEMENTS

An important opportunity to discuss the future — join Linear Collider@CERN Workshop 2026



Join us for the Linear Collider@CERN Workshop 2026! This LCVision workshop will address preparation-phase activities, future upgrade options, and organisational aspects in light of the European Strategy outcome.

AROUND THE WORLD

Forging New Paths for the Future: LCWS 2025 in Valencia

by Rika Takahashi



At LCWS 2025 in Valencia, more than 300 researchers united to shape the future of linear colliders, from Higgs-factory design to next-generation acceleration. A week of innovation, strategy, and fresh momentum for the global community.

AROUND THE WORLD

Season 2 of YouTube Series Featuring Hitoshi Murayama Begins

by Rika Takahashi



A new season of the YouTube series on ILC channel featuring theoretical physicist Hitoshi Murayama has started on 5 November, bringing renewed attention to the future of the ILC.

IN THE NEWS

from *IBC News*
08 December 2025
「宇宙や人類の誕生に関わる研究を日本で行うことは意義がある」物理学者・村山斉氏による講演会　ＩＬＣ誘致に向け機運醸成目指す
岩手県ILC推進協議会が開催した8日の講演会では、物理学者でカリフォルニア大学バークレー校の村山斉教授が講師を務めました。

from *Iwate Nippo*
27 November 2025
ILC誘致に向け超党派議連が再始動　人事決定、副会長に階猛氏
国際リニアコライダー（ＩＬＣ）誘致を推進する超党派国会議員連盟は２６日の総会で、会長に自民党の大野敬太郎衆院議員（香川３区）を充てる人事を決定した。副会長には立憲民主党の階猛衆院議員（岩手１区）が就く。会長不在などで活動が停滞していたが、組織体制を整え、誘致実現に向けて再始動する。

from *Iwate Nippo*
16 Novemebr 2025
ILC誘致の超党派議連、再構築へ　会長に大野氏（自民）見通し
不在となっていた国際リニアコライダー（ＩＬＣ）誘致を推進する超党派国会議員連盟の会長に、自民党の大野敬太郎衆院議員（香川３区）が就く見通しとなった。１５日、複数の関係者への取材で分かった。月内にも総会を開き、体制を再構築する。停滞していた議連の動きが活発化しそうだ。

from *AZO Quantum*
13 October 2025
What Is the God Particle? A Guide to the Higgs Boson
Looking ahead, proposed facilities like the International Linear Collider could provide much more precise measurements of the Higgs boson’s properties. Such advancements may help address some of the most pressing open questions in physics, including the nature of dark matter, the matter–antimatter asymmetry, and whether the Standard Model is truly complete or requires extension

from *Iwate Nippo*
26 September 2025
自民鈴木総務会長、小野寺政調会長がKEKで技術進展確認　ILC誘致向け
自民党の鈴木俊一総務会長（衆院岩手２区）と小野寺五典政調会長は２５日、茨城県つくば市の高エネルギー加速器研究機構（ＫＥＫ）を視察した。国際リニアコライダー（ＩＬＣ）の誘致に向け技術の進展を確認した。

from *Kahoku Shinpo*
25 September 2025
国際プロジェクトのホスト国、高度人材集積で利点　ILC推進協がITER機構の室長招き講演会
東北ＩＬＣ推進協議会は、岩手、宮城両県にまたがる北上山地が建設候補地の超大型加速器「国際リニアコライダー（ＩＬＣ）」の誘致に向け、仙台市内で講演会を開いた。

from *Iwate Nippo*
30 August 2025
ILC関連予算10.5億円要求　文科省
文部科学省が２９日公表した２０２６年度予算の概算要求で、国際リニアコライダー（ＩＬＣ）関連は２５年度当初予算と同額の１０億５千万円が計上された。将来加速器の性能向上に向けた重要要素技術開発事業費として、２５年度と同じ７億円が盛り込まれた。素粒子物理学研究者の国際組織であるＩＬＣテクノロジーネットワークの枠組みを活用して取り組みを推し進める。

PREPRINTS

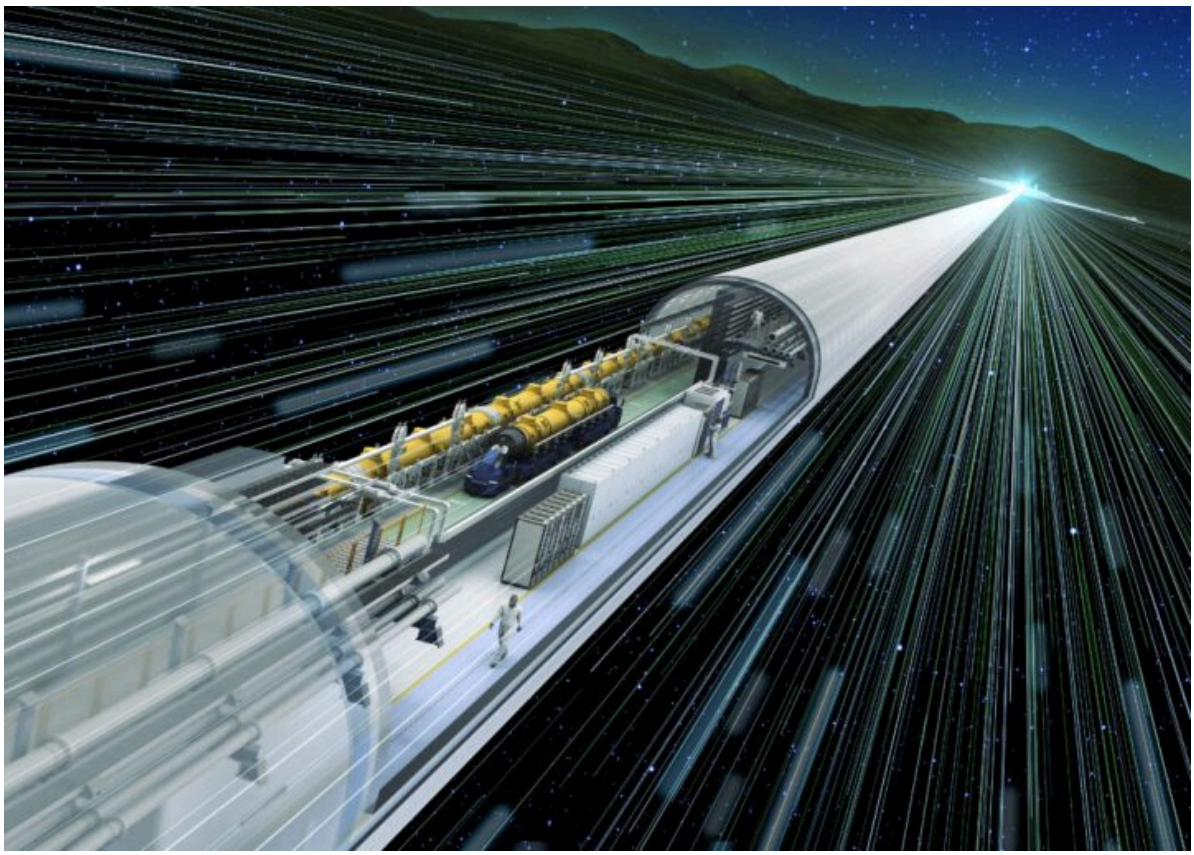
ARXIV

- **2512.13022**
  Measurement of Position Resolutions of L-band Cavity Beam Position Monitors

- **2511.01007**
  Prospects for Measuring the Higgs Boson Decay to WW∗ in Fully Hadronic Final States at the ILC Using Multivariate Techniques
- **2508.18496**
  Searching for the Leptophilic Gauge Boson Zl at Future e+e− Colliders
- **2508.13527**
  Complementarity between gravitational wave signatures and Higgs precision measurements of a classically conformal hidden U(1) extended Standard Model
- **2507.08678**
  Search for a Dark Gauge Boson Within Einstein-Cartan Theory at the ILC Using Multivariate Analysis

IDT Activities and Outlook- Summarising the 2025 activities by the IDT and anticipating what’s to come

by Tatsuya Nakada



The IDT activities this year have included finalising the ILC cost update, providing essential input to the update of the European Strategy for Particle Physics (ESPP), supporting the 2025 Linear Collider Workshop in Valencia, following the Linear Collider Facility Vision activities, and coordinating the ITN work. The Intermediate Status Report of the ITN is now close to completion and documents the impressive progress achieved across the programme.

The update of the ESPP has attracted significant attention from the global particle physics community. A draft strategy document proposed by the Strategy Group has recently been submitted to the CERN Council and made available to the community. It identifies FCC-ee as the preferred project, with a descoped version as an alternative should the preferred option prove unfeasible. The Council’s decision on this draft, at a dedicated meeting in Budapest in May, will have a profound impact on the future development of linear colliders, not only for the ILC and IDT, but also with broader and long-term consequences for the field.

We would like to thank all of you who have been supporting the IDT activities throughout the year. Exciting times are still to come in the coming period.

First Reflections on the Recommendations of the European Strategy Group

by Jenny List, Tatsuya Nakada and Steinar Stapnes

The recently released recommendations of the European Strategy Group discuss Linear Colliders as technologically mature flagship projects which offer a competitive science program in Higgs and Top physics, while not ranking alternative projects beyond the FCC-ee. The next steps for Linear Colliders will be discussed at the **LinearCollider@CERN Workshop** *in early January.*

by Jenny List, Tatsuya Nakada and Steinar Stapnes



On the 12th of December, CERN released the **Recommendations by the European Strategy Group (ESG)** for the update of the European Strategy for Particle Physics (ESPPU). This process was launched by CERN Council in March 2024. Milestones have included the **collection of community input** until the end of March 2025, the **Open Symposium** in Venice in June 2025, the publication of the **Physics Briefing Book** in September 2025 and the ESG's **Assessment of large-scale projects proposed for CERN** – and most recently the drafting session of the ESG, held in Ascona December 1-5. The resulting recommendations were presented to CERN Council last week. Council for now took note, and will assess them in the coming months, with aiming to take a decision in May 2026, at a dedicated Session to be held in Budapest.

With regard to a future large-scale project at CERN after the HL-LHC, the ESG was charged with identifying the preferred option for the next collider at CERN and prioritised alternative options to be pursued if the chosen preferred plan turns out not to be feasible or competitive. As easily anticipated, the now published recommendations very clearly identify the circular electron-positron collider FCC-ee with a cost of about 15 billion Swiss Francs (BCHF) as the preferred option for the next collider at CERN. As preferred alternative option, they propose a descoped version of FCC-ee, aiming to reduce the costs by about 15% by decreasing the number of experiments from four to two, limiting the centre-of-mass energy to 240 GeV, and reducing the RF power by an unspecified amount. The recommendations refrain from ranking other options, however they point out that neither LEP3 nor LHeC would be a flagship collider, and would need to be complemented by an energy-frontier machine, such as a hadron collider.

With regard to Linear Colliders, the ESG recognized that they offer programmes in Higgs and Top-quark physics competitive to FCC-ee when operated at two energy stages and up to 550 GeV centre-of-mass energy, while stressing the absence of a competitive flavour physics program. They note that the CLIC technology could offer a more cost-effective implementation of a Linear Collider, while SCRF technology is more mature. Starting from a Linear Collider, they consider plasma wakefield acceleration as the only option for exploring the 10-TeV parton

centre-of-mass energy scale – clearly a very different view from the one we expressed in the strategy submissions of the LCVision team, which consider a Linear Collider compatible with a variety of future paths and emphasize flexibility with regard to scientific and technological developments of the next decades as strong asset.

Following their prior assesment of large-scale projects, the ESG considers neither a hadron collider nor a muon collider, which is favoured as the future target by our colleagues in the US as the main option for their next collider project. However the ESG recommends that next to R&D on advanced superconducting and normal-conducting RF structures, efficient RF power sources and accelerator-quality high-field magnets, also energy recovery linacs and advanced technologies, such as high-gradient wakefield acceleration and those underpinning bright muon beams, should be supported at an appropriate level.

The ESG also stresses that the exploitation of HL-LHC remains the highest priority, and recommends support for a diverse spectrum of non-collider experiments, for detector R&D, theory, computing and technology transfer and comments on cooperation with other European particle physics labs, relations with other fields, sustainability, as well as outreach, communication and early career researchers.

What do these recommendations imply for the Linear Collider community? A definitive answer to this question will take time. The **LinearCollider@CERN Workshop** in early January will be an important opportunity to discuss the future, while it will take a few months to understand how CERN Council and the incoming CERN management will implement these recommendations. Nevertheless, let us already today share a few observations:

- With the descoped FCC-ee, the ESG chose as preferred alternative an option which was not among the inputs submitted to the ESPPU and thus neither included in the Physics Briefing Book, nor well documented in terms of scope, nor assessed by the ESG working groups. The scientific impact of the suggested measures – limiting the centre-of-mass energy to below the Top pair production threshold, reducing of the number of experiments and thus the integrated luminosity by about a factor of two, times a further reduction of the in instantaneous luminosity per interaction point from an unspecified decreasing of the radiofrequency (RF) system power – still needs to be presented in detail, but obviously will have significant consequences for Higgs physics, Top physics and multi-gauge boson production – all topics which for many years have been considered the highest priority for particle physics.
  In terms of financial feasibility, a cost reduction of 15% is about half of the size of the uncertainty of the current cost estimates for FCC-ee[1] . Therefore this preferred alternative, despite the very significant physics descoping, does not offer a real alternative for the case that a substantially more affordable project is required. If costs were to rise, then an intended full FCC-ee may well anyhow default to this descoped version.

- A first-stage Linear Collider would cost around 7 BCHF in the very lowest-cost scenario and up to 9 BCHF when choosing the most mature technology and providing for higher luminosity as well as easier upgradability. This would offer a much more affordable path to deliver at least the Higgs physics program of the descoped FCC-ee. For the full price of the descoped FCC-ee, a Linear Collider could reach sufficient energy to pursue an excellent Top physics programme and to access di-Higgs production and thereby improve our understanding of the Higgs potential significantly beyond what we will learn from HL-LHC. The wish to build a tunnel infrastructure which could be used for a hadron collider in the future seems to carry a large weight in the choice of the ESG.

- The CERN press release explains that a decision by CERN Council on the possible construction of the FCC is expected in 2028. This acknowledges the strong wish in the particle physics community, and in particular among the younger generations, for a timely decision on the next flagship project for CERN – essential to minimize the “dark time” between the end of HL-LHC data-taking and the start of operation of a new collider. In order to avoid delays, it seems essential that until then, both the preferred flagship and a **real alternative project** are advanced to towards decision readiness. We strongly hope that this aspect will be considered in the implementation of the recommendations.

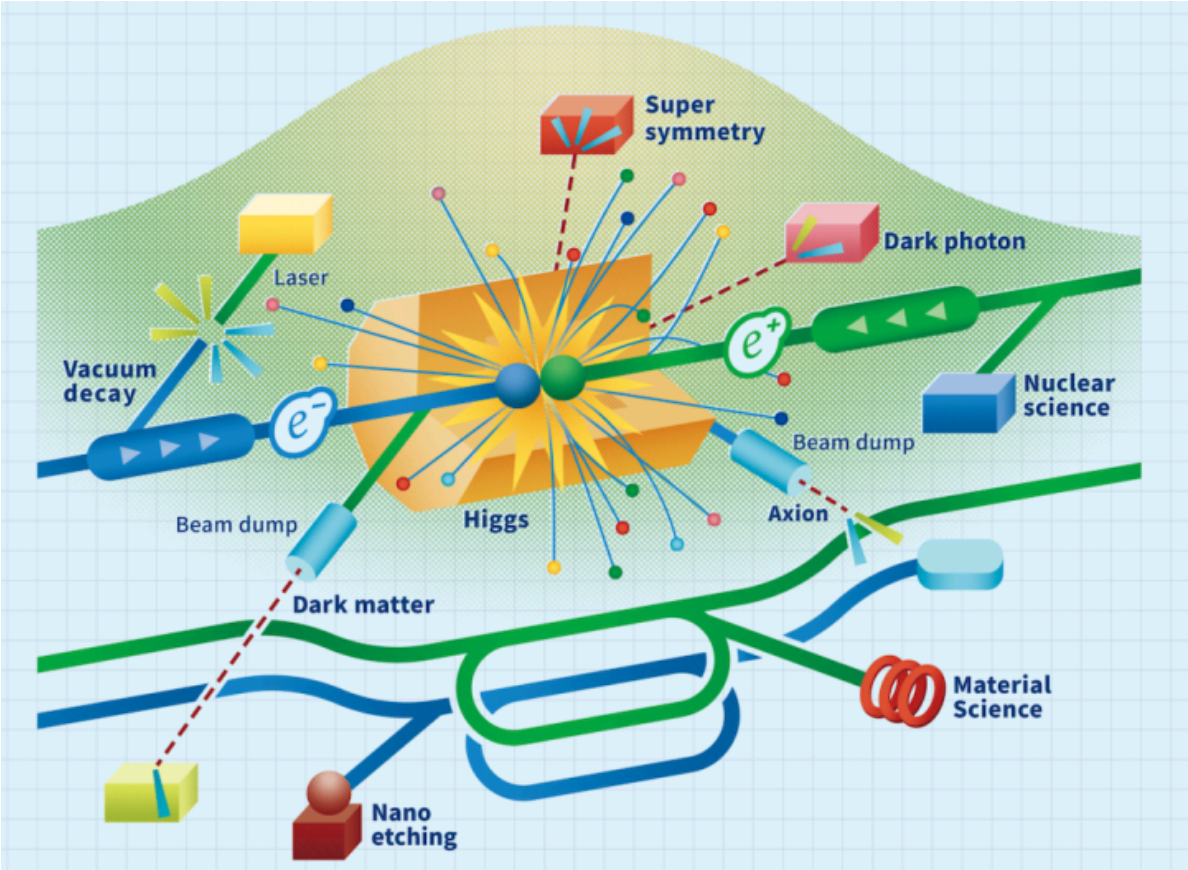
In summary, the “preferred alternative” nominated by the ESG is not really an alternative project, but rather a staged path to the full programme with a relatively small cost reduction in the first stage. On the other hand, recommendations on those projects that are actually different from FCC-ee, although not explicitely ranked by the ESG, make it quite clear that Linear Colliders are technologically mature and offer a competitive science program in Higgs and Top physics. We now need so see how this important insight will be reflected in the further discussions in CERN Council and in the first steps towards implementation of the strategy by CERN management.

LCVision team, CLIC and ILC IDT, consider realization of a linear collider is crucial for the future of particle physics. We would like to encourage you to join us in January for the **LinearCollider@CERN workshop** – in person or on zoom – to help substanciating the workplan for a Linear Collider Facility, taking into various technologies offering a forward-looking upgrade path. Until then we wish you a peaceful and relaxing end-of-the year break and hope to see you all next year in good spirit to discuss the future of Linear Colliders.

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[1] FCC-ee cost estimate assessed as being class 3 (-10% / +30%) or class 4 (-15% / + 50%) for all major subsystems in ESG WG2a report.

An important opportunity to discuss the future - join Linear Collider@CERN Workshop 2026



Following the outcome of the European Strategy for Particle Physics, this workshop organised in the context of LCVision will discuss the next steps for a linear collider at CERN, including the technical work in the preparation phase, the long-term evolution with future upgrade options as well as organisational aspects.

Participation is free of charge, but registration is required.

For further detail, please visit **workshop webpage**.

The registration for in-person participation will close on December 18 -- Join now!

Forging New Paths for the Future: LCWS 2025 in Valencia

by Rika Takahashi



Under the Mediterranean sun, the old town of Valencia, Spain, became a hub of energy and ideas as more than 300 physicists, engineers, and students gathered for the **2025 International Workshop on Future Linear Colliders (LCWS 2025)**. Hosted by IFIC (CSIC/University of Valencia), the workshop brought together the global community working toward the realisation of a next-generation electron–positron linear collider — a precision instrument designed to explore the Higgs boson, the top quark, and physics beyond the Standard Model.

With the upcoming update of the European Strategy for Particle Physics, LCWS 2025 served not only as a technical review but also as a strategic forum for shaping the field's future direction. Participants examined the latest developments from the three main linear collider concepts — the International Linear Collider (ILC), CLIC, and C^3— as well as advances in novel acceleration schemes, discussing how each could serve as a "Higgs factory" and beyond.

"This year, the workshop beautifully reflected the collaboration and continuity within the linear collider community," said Adrián Irles, Chair of the Local Organising Committee of LCWS 2025. "A highlight was the special poster session, which paid tribute both to the history of LCWS and to the creativity of early-career researchers. Inspired by Antonio Machado's verses — *'Caminante, no hay camino, se hace camino al andar'* — we celebrated the new paths being forged by young scientists, while *'Caminante, no hay camino, sino estelas en la mar'* reminded us of the lasting marks left by those who came before," added Daniel Esperante, another Chair of the Local Organising Committee for the workshop.

Throughout the week, plenary sessions provided updates on accelerator technology, detector development, and physics prospects. Researchers presented significant advances in high-gradient RF systems, beam delivery, and particle-flow detectors, while emphasizing realistic staging scenarios and the importance of international collaboration to bring a future collider from concept to construction.

Detector teams showcased progress on vertex and calorimeter prototypes, and software experts led tutorials on Key4hep, a unified framework for simulation and reconstruction. Early-career physicists played a prominent role throughout, underscoring the community's commitment to training and open collaboration.

"The enthusiasm and exchange of ideas throughout the workshop truly embodied the spirit of our community," the Local Committee Chairs added.

Beyond technical sessions, much of the discussion centred on the path forward — ensuring that the next update of the European Strategy and national science agencies receive coordinated, coherent input from the linear collider community. Participants highlighted the need for comparative studies of physics reach, cost, and technological readiness across collider options, as well as continued R&D on high-gradient structures, beam-delivery stabilisation, and detector prototype validation.

As LCWS 2025 came to a close, participants left Valencia with renewed energy and a shared sense of purpose. Whether the next major collider takes shape as the ILC in Japan, the LCF at CERN, or another emerging concept, the community remains united by a single goal: to build the precision tool that will define the next era of particle physics.

Season 2 of YouTube Series Featuring Hitoshi Murayama Begins

by Rika Takahashi

A new season of the YouTube series on ILC channel featuring theoretical physicist **Hitoshi Murayama** has started on 5 November, bringing renewed attention to the future of the **International Linear Collider (ILC)**.

The first episode delves into the **United States' future plans for high-energy physics**, outlining how upcoming strategic decisions may influence global collider projects, including the ILC. Murayama breaks down the context of the U.S. planning process and discusses how international coordination will be essential for advancing next-generation accelerator initiatives.official YouTube channel.

https://youtu.be/B1AduT94pkY