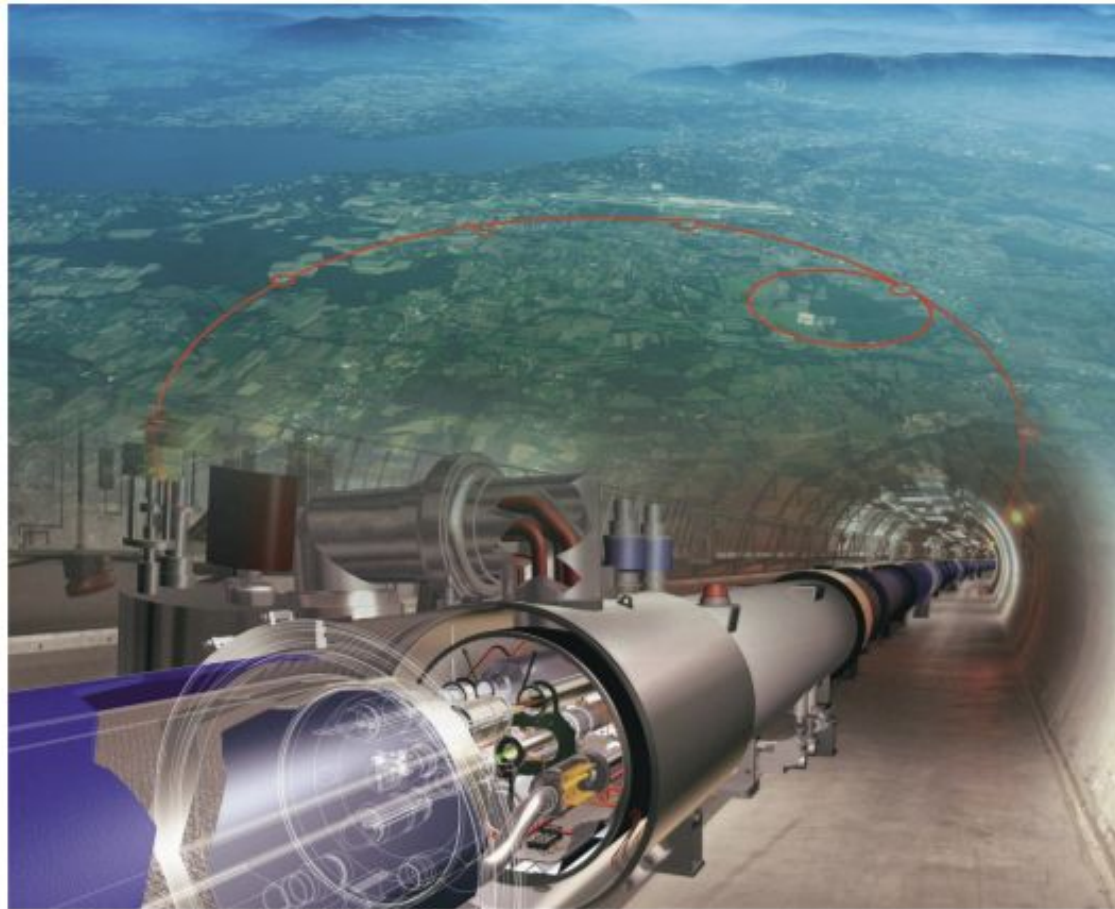


# ECFA

European Committee for Future Accelerators



ECFA: A. Ferrari, R. Pasechnik

RECFA: D. Milstead. CERN Council: K. Jon-And, R. Brenner

# European Committee for Future Accelerators

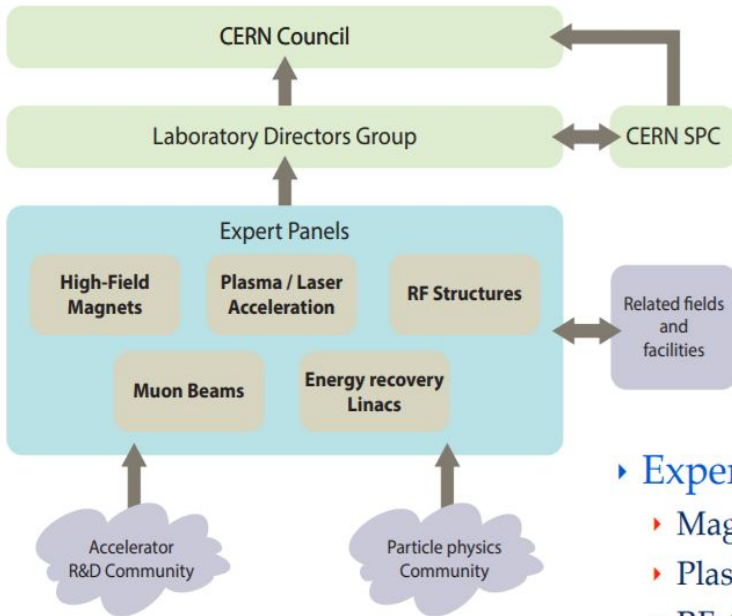
- Plenary ECFA, Restricted ECFA
- Primary aim is the planning of the high-energy facilities including accelerators, large-scale experiments, technologies and equipment necessary for particle physics research by the community of participating European countries
- Activities
  - Study groups set up by ECFA or with other organisations to address special challenges
  - Collecting/sharing/implementing/monitoring of views/trends across Europe
  - Symposia/seminars/conferences sponsored/organized by ECFA
  - (RECFA) visits to individual countries
  - Regular meetings

# Implementation of the ECFA Detector R&D Roadmap

- Establish detector R&D collaborations for focus areas
- Collaborations anchored at CERN
- Community driven
- Aim for regular funding, e.g. rolling grants

Gaseous	<b>DRDT 1.1</b>	Improve time and spatial resolution for gaseous detectors with long-term stability
	<b>DRDT 1.2</b>	Achieve tracking in gaseous detectors with dE/dx and dN/dx capability in large volumes with very low material budget and different read-out schemes
	<b>DRDT 1.3</b>	Develop environmentally friendly gaseous detectors for very large areas with high-rate capability
	<b>DRDT 1.4</b>	Achieve high sensitivity in both low and high-pressure TPCs
Liquid	<b>DRDT 2.1</b>	Develop readout technology to increase spatial and energy resolution for liquid detectors
	<b>DRDT 2.2</b>	Advance noise reduction in liquid detectors to lower signal energy thresholds
	<b>DRDT 2.3</b>	Improve the material properties of target and detector components in liquid detectors
	<b>DRDT 2.4</b>	Realise liquid detector technologies scalable for integration in large systems
Solid state	<b>DRDT 3.1</b>	Achieve full integration of sensing and microelectronics in monolith CMOS pixel sensors
	<b>DRDT 3.2</b>	Develop solid state sensors with 4D-capabilities for tracking and calorimetry
	<b>DRDT 3.3</b>	Extend capabilities of solid state sensors to operate at extreme fluences
	<b>DRDT 3.4</b>	Develop full 3D-interconnection technologies for solid state device in particle physics
PID and Photon	<b>DRDT 4.1</b>	Enhance the timing resolution and spectral range of photon detectors
	<b>DRDT 4.2</b>	Develop photosensors for extreme environments
	<b>DRDT 4.3</b>	Develop RICH and imaging detectors with low mass and high resolution timing
	<b>DRDT 4.4</b>	Develop compact high performance time-of-flight detectors
Quantum	<b>DRDT 5.1</b>	Promote the development of advanced quantum sensing technologies
	<b>DRDT 5.2</b>	Investigate and adapt state-of-the-art developments in quantum technologies to particle physics
	<b>DRDT 5.3</b>	Establish the necessary frameworks and mechanisms to allow exploration of emerging technologies
	<b>DRDT 5.4</b>	Develop and provide advanced enabling capabilities and infrastructure
Calorimetry	<b>DRDT 6.1</b>	Develop radiation-hard calorimeters with enhanced electromagnetic energy and timing resolution
	<b>DRDT 6.2</b>	Develop high-granular calorimeters with multi-dimensional readout for optimised use of particle flow methods
	<b>DRDT 6.3</b>	Develop calorimeters for extreme radiation, rate and pile-up environments
Electronics	<b>DRDT 7.1</b>	Advance technologies to deal with greatly increased data density
	<b>DRDT 7.2</b>	Develop technologies for increased intelligence on the detector
	<b>DRDT 7.3</b>	Develop technologies in support of 4D- and 5D-techniques
	<b>DRDT 7.4</b>	Develop novel technologies to cope with extreme environments and required longevity
	<b>DRDT 7.5</b>	Evaluate and adapt to emerging electronics and data processing technologies
Integration	<b>DRDT 8.1</b>	Develop novel magnet systems
	<b>DRDT 8.2</b>	Develop improved technologies and systems for cooling
	<b>DRDT 8.3</b>	Adapt novel materials to achieve ultralight, stable and high precision mechanical structures. Develop Machine Detector Interfaces.
	<b>DRDT 8.4</b>	Adapt and advance state-of-the-art systems in monitoring including environmental, radiation and beam aspects
Training	<b>DCT1</b>	Establish and maintain a European coordinated programme for training in instrumentation
	<b>DCT2</b>	Develop a master's degree programme in instrumentation

# Accelerator R&D Roadmap



## Expert panel chairs

- ▶ Magnets: P. Ventrone (IRFU)
- ▶ Plasma: R. Assmann (DESY)
- ▶ RF: S. Bousson (IJCLab)
- ▶ Muons: D. Schulte (CERN)
- ▶ ERL: M. Klein (Liverpool)
- ▶ Co-opted authors for additional sections

- Presented to CERN and Lab Directors' Group
- Final approval in June
- Coordination structure to be appointed

# Working groups

- Recognition in large collaborations
  - Community-wide survey
  - Follow-up with APPEC-ECFA-nuPECC (cross-disciplinary issue)
  - Invite reps from large collaborations for discussion
- Early career researchers
  - Community-wide survey
    - Events bringing together senior and early career researchers
    - Bring in electron-ion collider community
    - Focus on diversity in physics



# JENAS-2022

## 2nd Joint ECFA-NuPECC-APPEC Seminar

Exploring synergies between Particle, Astroparticle and Nuclear Physics

**TOPICS:**

- Physics highlights
- Future projects and overall strategies
- Detector technologies
- Computing and software
- Diversity and recognition in large scale projects
- Education and Outreach
- Transfer of knowledge

**May 3-6, 2022**  
**Madrid, Spain**




*The many synergies between Particle, Astroparticle and Nuclear Physics are addressed in the second Joint Seminar. Physics highlights, future projects and strategies as well as challenges in detector technology and computing are discussed.*

**JENAS 2022 Committee**

**ECFA:** Bart Janssens (Chair, Probing),  
Patrik Couderc (Munich ILM, Lohse),  
Jürgen (H. Wirth) (PSI, Storz)

**APPEC:** Andreas Knuettel (KIT, Karlsruhe),  
Katharina Heide (DFKZ, Aachen),  
Dennis Mousaoui (DFKZ, Aachen)

**NuPECC:** Marco Lodi (INFN, Frascati),  
Dorothea Wollmann (GSI, Mainz),  
Sabine Elisabeth Zomer (TU-Munich, Sarrasin)

**Local Committee**

María José García Soto (IFW, Mainz),  
Antonio Gomez (ICM, Granada),  
Carlos Polo Duro (LHC, CERN),  
Jaques Gomez (INFN, Frascati),  
Jesús Martínez López (IFW, Mainz),  
Luis María Peña (ICM, Madrid)

**ECFA**  **NuPECC**  **APPEC** 

<https://indico.cern.ch/event/1040535/>

- Status of Joint Activities
- Poster session (targeting Young Researchers)
- Discussion with Funding Agency (Thursday)

Topics:

- Present the Science Case, Big Questions
- Detector R&D, Computing;
- Discussion on (additional, common) funding for these activities;
- Governance models for large facilities

**Joint Activities:** <http://www.nupec.org/jenaa/?display=eois>

1. Dark Matter - iDMEu (<https://indico.cern.ch/event/869195/overview>)
2. Gravitational Waves for fundamental physics (<https://agenda.infn.it/event/22947/overview>)
3. Machine-Learning Optimized Design of Experiments - MODE (<https://userswww.pd.infn.it/~dc>)
4. Nuclear Physics at the LHC (<https://indico.ph.tum.de/event/4492/>)
5. Storage Rings for the Search of Charged-Particle Electric Dipole Moments (EDM) (<https://indico.cern.ch/event/1040535/>)
6. Synergies between the Electron-Ion Collider and the Large Hadron Collider experiments ( )

Kickoff meeting for EoI 6 (EIC-LHC) has been fixed for 21/22 June at CERN





- Workshop Committees (LOC, PC, IAC) have been defined
  - Regular meetings with LOC
    - \* Very competent LOC team
    - \* Great support from DESY (administrative and financial) e.g. in-kind support for ECRs (DESY hostel), support for Ukrainian physicists
    - \* Web page under dev.
    - \* Poster under dev.
- Important meeting between PC and IAC on Monday 4<sup>th</sup> April
  - first programme discussion;  
further discussion on Public Event

# RECFA visits

- Italy 4/5 March
- Germany: 1/2 April
- ~~Ukraine 13-14 May~~
- Denmark 12/13 May
  
- Hungary 23/24 September
- Israel 3/4 November

## Plenary ECFA

- 21/22 July (CERN)
- 17/18 Nov (CERN)



# Measures taken by CERN council concerning the invasion of Ukraine by the Russian Federation

In an extra Council meeting on 8 March 2022 a resolution was adopted,  
[https://cds.cern.ch/record/2803319/files/c-e-3626\\_Resolution\\_re\\_Russia%20.pdf](https://cds.cern.ch/record/2803319/files/c-e-3626_Resolution_re_Russia%20.pdf),  
where Council:

- **STRONGLY CONDEMNS**

The military invasion of Ukraine by the Russian Federation, in violation of Article 2 (4) of the Charter of the United Nations;

- **STRONGLY SUPPORTS**

The people of Ukraine as well as the independence, sovereignty and territorial integrity of Ukraine;

- **DEPLORES**

The resulting loss of life and humanitarian impact;

The involvement of Belarus in this unlawful use of force against Ukraine;

- **DECIDES THAT**

CERN will promote initiatives to support Ukrainian collaborators and Ukrainian scientific activity in the field of high-energy physics;

- **The Observer status of the Russian Federation is suspended until further notice;**
- **CERN will not engage in new collaborations with the Russian Federation and its institutions until further notice;**
- The situation will continue to be monitored carefully and the Council is ready to take any further measures as appropriate.

**In the Council meeting on 25 March 2022 two resolutions were adopted.**

**One resolution concerning The Russian Federation and Belarus,**

[https://council.web.cern.ch/sites/default/files/c-e-3637Corr\\_Council%20resolution\\_%20RU\\_BY.pdf](https://council.web.cern.ch/sites/default/files/c-e-3637Corr_Council%20resolution_%20RU_BY.pdf), where Council:

- **STRONGLY CONDEMNS**

The statements by those Russian institutes that have expressed support for the illegal invasion of Ukraine;

- **COMMENDS**

The measures taken by the Management both before and following the Extraordinary Session of the Council on 8 March 2022, including compliance with all applicable international sanctions and the effective suspension of all exchanges of funds, materials and personnel in both directions with Russia and Belarus which were appropriate and timely;

- **DECIDES THAT**

**1):** Such measures will be further enhanced, until further notice, by

- suspension of the participation of CERN scientists in all scientific committees of institutions located in the Russian Federation and the Republic of Belarus, and vice versa,
- suspension or, that failing, cancellation of all events jointly arranged between CERN and institutions located in the Russian Federation and the Republic of Belarus,
- suspension of granting of contracts of association as associated members of the CERN personnel to any new individuals affiliated to home institutions in Russia and Belarus;

**2):** In the perspective of making a decision at its Session in June 2022 on the suspension of the International Cooperation Agreements and the related Protocols and Addenda as well as any other agreements, including *mutatis mutandis* experiment Memoranda of Understanding, allowing for the participation of the Russian Federation and the Republic of Belarus and their national institutes in the CERN scientific programme, the Council will consider additional information and an action plan, and will further analyse the full consequences of such a decision.

## One resolution concerning the JINR,

[https://council.web.cern.ch/sites/default/files/c-e-3638Corr\\_Council%20Resolution\\_JINR.pdf](https://council.web.cern.ch/sites/default/files/c-e-3638Corr_Council%20Resolution_JINR.pdf), where Council:

### COMMENDS

The measures taken by the Management both before and following the Extraordinary Session of the Council on 8 March 2022, including compliance with all applicable international sanctions and the effective suspension of all exchanges of funds, materials and personnel in both directions with JINR, which were appropriate and timely;

### DECIDES THAT

- 1) Such measures will be further enhanced, until further notice, by
  - suspension of the participation of CERN scientists in all JINR scientific committees, and *vice versa*,
  - suspension or, that failing, cancellation of all events jointly arranged between CERN and JINR,
- 2) CERN will not engage in new collaborations with JINR until further notice;
- 3) Until further notice, the Observer status of JINR at the Council is suspended and CERN will not exercise the rights resulting from its Observer status at JINR;
- 4) In the perspective of making a decision at its Session in June 2022 on the suspension of the International Cooperation Agreements and the related Protocols and Addenda as well as any other agreements, including *mutatis mutandis* experiment Memoranda of Understanding, allowing for the participation of JINR in the CERN scientific programme, the Council will consider additional information and an action plan, and will further analyse the full consequences of such a decision.

**The issues of International Cooperation Agreements with The Russian Federation, Belarus and JINR will be discussed in a Council meeting on 16 June 2022**

# Summary

- RECFA country visits are resuming as the covid era ends
- Detector and accelerator roadmaps are being implemented.
- Recognition and early career initiatives
- CERN has taken steps wrt Ukraine war