

# The European Research Council

## ERC funding opportunities

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Research Programme Agent

ERCEA.B.4 - Physical Sciences and Engineering

*Workshop on Resurgence, wall-crossing and geometry*

*Synergy Grant ReNewQuantum*

*14 January 2025, SwissMAP Research Station*



**European Research Council**

Established by the European Commission

# The ERC: funding from and for researchers

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## Scientific freedom

- Bottom-up frontier research in all fields of science and humanities (no predetermined subjects)
- Individual researchers (no consortia)

## Scientific governance

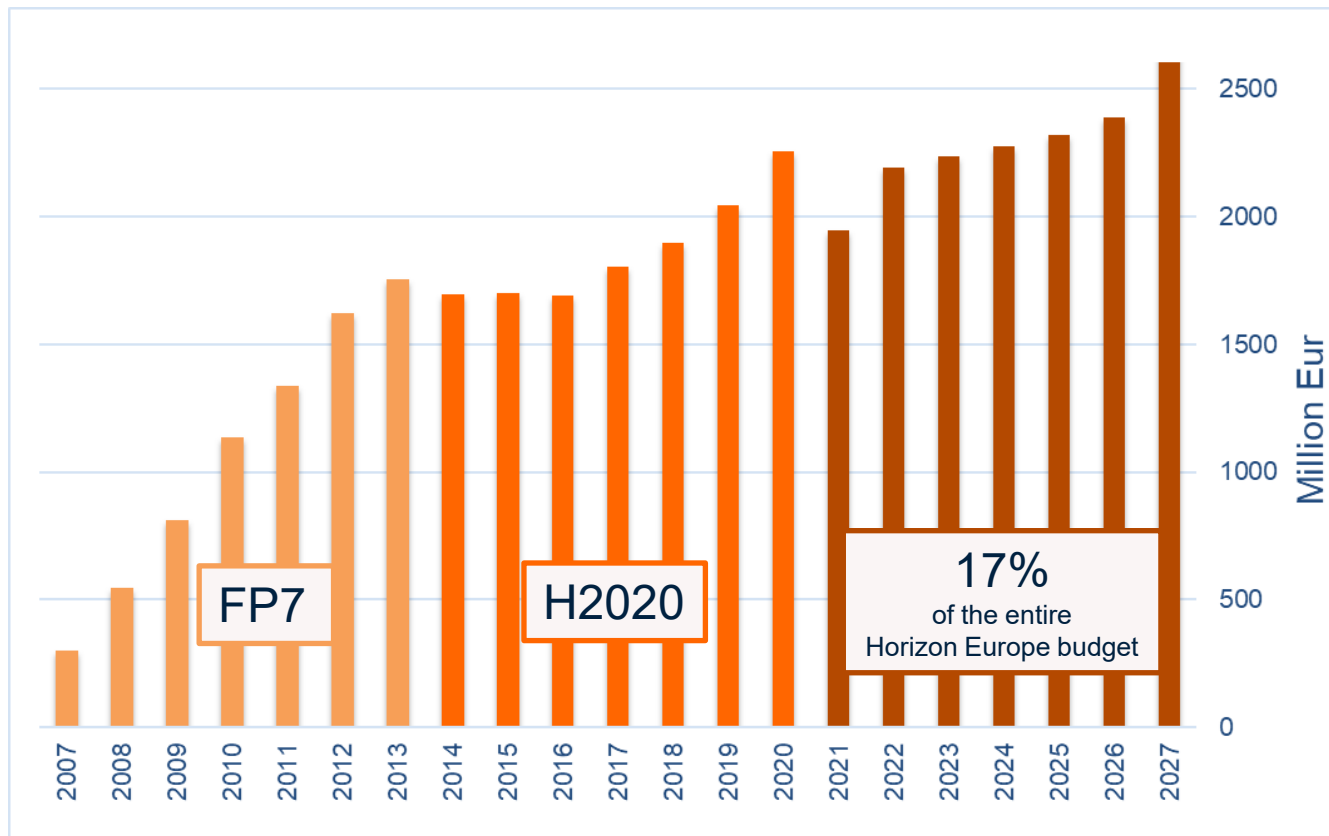
- Independent Scientific Council with full authority over strategy

## Scientific evaluation

- Scientific excellence is the sole criterion (societal/economic impact not necessary)
- International peer-review (Evaluation Panels and Remote Reviewers from all over the world)



# ERC budget 2007 – 2027: EUR 36.5 billion



# ERC grant schemes

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## Starting Grant

2-7 years after PhD

Up to € 1.5 Mio for 5 years



## Consolidator Grant

7-12 years after PhD

Up to € 2 Mio for 5 years



## Advanced Grant

Track-record of significant research achievements in the last 10 years

Up to € 2.5 Mio for 5 years



## Synergy Grant

2 – 4 Principal Investigators

1 PI can be based outside EU/Associated Countries

Up to € 10.0 Mio for 6 years



## Proof-of-Concept

For ERC grant holders

Bridging gap between research and marketable innovation

Lump sum €150,000

# Hot in Brussels – Next Framework Programme

## Time for a major shakeup of how the EU funds research, expert group says

Except for the ERC!

16 Oct 2024 | News

### Recommendation 5: Strengthen competitive excellence in Research and Innovation

The report recommends doubling the budget of the European Research Council (ERC), and significantly increasing the budget of the EIC.

It also emphasises the importance of safeguarding the independence of the ERC's Scientific Council, and ensuring the EIC is similarly protected from pressure from member states or Commission services.

“The uniqueness of the European research, development and innovation system these days has been created, above all, by the European Research Council,” said Heitor. There are no specific recommendations for improving the ERC, as the group felt it was important to preserve its independent decision making.

- Manuel Heitor – Professor at Instituto Superior Técnico, University of Lisbon
- Conny Aerts – Recipient of the 2022 Kavli Prize in Astrophysics
- Anders Bjarklev – President, Technical University of Denmark
- Annelien Bredenoord – Rector Magnificus, Erasmus University Rotterdam
- Maria Chiara Carrozza – President, Consiglio Nazionale delle Ricerche
- Dessislava Dimitrova – CEO, Bio Stopanstvo Lopyanko
- Heinz Fassmann – President, Austrian Academy of Sciences
- Mark Ferguson – Chair of the board, SoilSteam AS Norway
- Agrita Kiopa – Vice Rector for Research, Riga Stradiņš University
- Kaia Palm – CEO, Protobios
- Adam Piotrowski – President of the board, Vigo Photonics
- Isabelle Ryl – Director, Paris Artificial Intelligence Research Institute
- Georg Schütte – Secretary-General, Volkswagen Foundation
- Sylvia Schwaag Serger – Chair of the Scientific Council, Swedish Research Council for Sustainable Development
- Antti Vasara – President & CEO, VTT, Technical Research Centre of Finland Ltd.



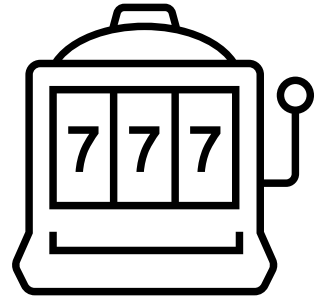
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<https://op.europa.eu/en/publication-detail/-/publication/2f9fc221-86bb-11ef-a67d-01aa75ed71a1/language-en>  
<https://sciencebusiness.net/news/fp10/time-major-shakeup-how-eu-funds-research-expert-group-says>  
[https://ec.europa.eu/commission/presscorner/detail/en/ip\\_24\\_5305](https://ec.europa.eu/commission/presscorner/detail/en/ip_24_5305)

# Quiz – Test your estimation powers!

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**1) How many Synergy Grants were awarded so far?** [since 2018]

Synergy proposals need to select between 4 and 6 “ERC keywords”

*Example: ReNewQuantum selected 4 from the PE1 Mathematics panel:*

*i) Algebraic and complex geometry, ii) Geometry, iii) Mathematical physics, iv) Topology*

**2) How many other Synergy Grants selected at least 1 pure math keyword, including *Mathematical physics*?** [do not count ReNewQuantum]

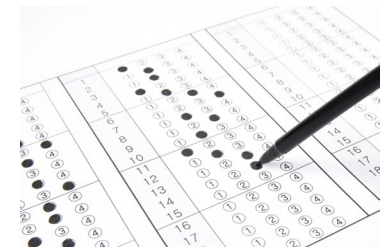
**3) How many Synergy Grants share at least one keyword with ReNewQuantum?** [no reflexivity: do not count ReNewQuantum]

**4) How many other Synergy Grants selected the ERC keyword *Mathematical physics*?** [do not count ReNewQuantum]



# Answer key

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1) Synergy Grants: 228

Other than ReNewQuantum:

2) Selected at least 1 pure math keyword, including *Mathematical physics*: 8

3) Share at least one keyword with ReNewQuantum: 3

4) Selected *Mathematical physics*? 1 !

Call	Projects
ERC-2018-SyG	27
ERC-2019-SyG	38
ERC-2020-SyG	34
ERC-2022-SyG	35
ERC-2023-SyG	37
ERC-2024-SyG	57
<b>Grand Total</b>	<b>228</b>

# Related Synergy portfolio

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## Recursive and Exact New Quantum Theory (2018)

PIs: Andersen (DK), Eynard (FR), Kontsevich (FR), Mariño (CH)

## Modern Aspects of Geometry: Categories, Cycles and Cohomology of Hyperkähler Varieties (2019)

PIs: Debarre (FR), Huybrechts (DE), Macri (FR), Voisin (FR)

**The unreasonable effectiveness of wall-crossing in algebraic geometry**

Arend Bayer, Emanuele Macri

arXiv:2201.03654

## Positive Geometry in Particle Physics and Cosmology (2023)

PIs: Arkani-Hamed (US), Baumann (NL), Henn (DE), Sturmfels (DE)

## Mathematics of Scattering Amplitudes (2024)

PIs: Britto (IE), Brown (UK), Kleinschmidt (DE), Schlotterer (SE)





# Excellence

is the sole evaluation criterion

## Excellence of the Research Project

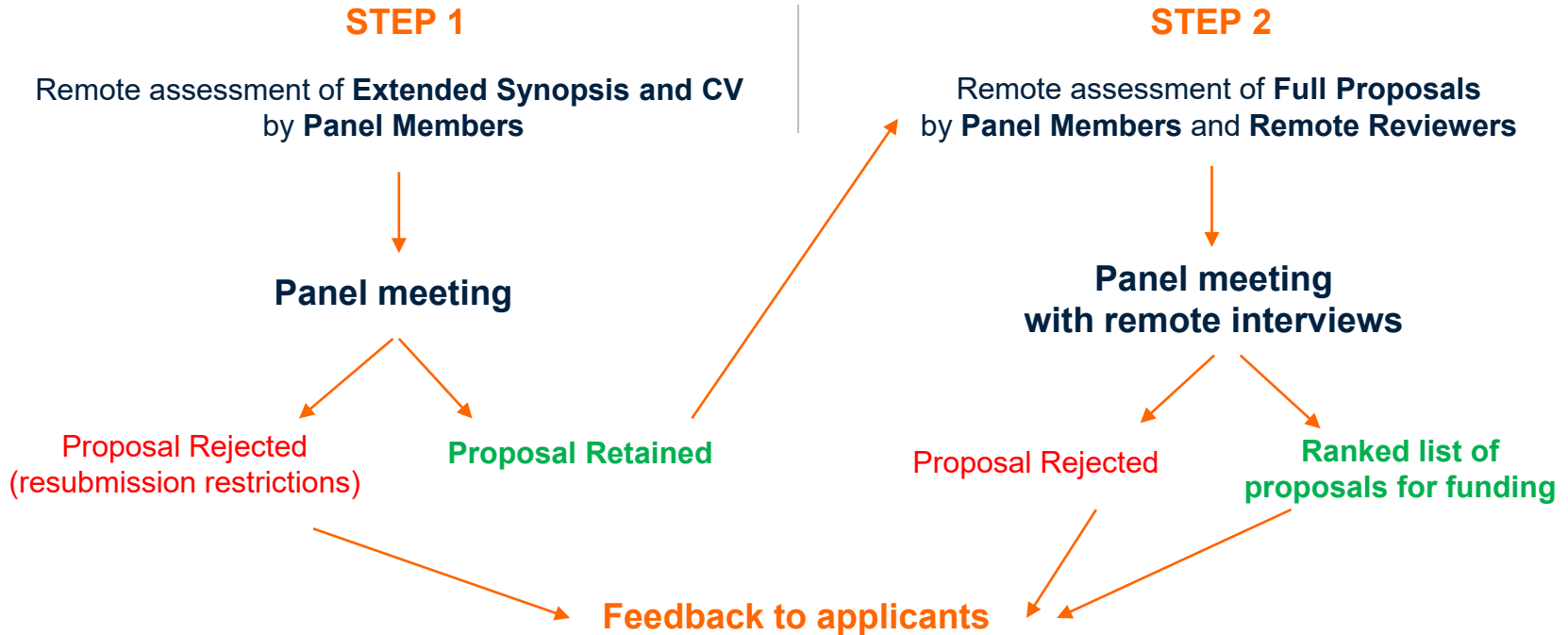
- Ground-breaking nature
- Ambition
- Feasibility of the research project

## Excellence of the Principal Investigator

- Intellectual capacity
- Creativity
- Commitment

# Evaluation process

For individuals calls: a single submission but a two-step evaluation



*Difference for Synergy Grants: three steps and interview in person*



# Evaluation panel structure

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## Life Sciences

- LS1 Molecules of Life: Biological Mechanisms, Structures and Functions
- LS2 Integrative Biology: From Genes and Genomes to Systems
- LS3 Cell Biology, Development, Stem Cells and Regeneration
- LS4 Physiology in Health, Disease and Ageing
- LS5 Neuroscience and Disorders of the Nervous System
- LS6 Immunity, Infection and Immunotherapy
- LS7 Prevention, Diagnosis and Treatment of Human Diseases
- LS8 Environmental Biology, Ecology and Evolution
- LS9 Biotechnology and Biosystems Engineering

## Physical Sciences & Engineering

- **PE1 Mathematics**
- PE2 Fundamental Constituents of Matter
- PE3 Condensed Matter Physics
- PE4 Physical and Analytical Chemical Sciences
- PE5 Synthetic Chemistry and Materials
- PE6 Computer Science and Informatics
- PE7 Systems and Communication Engineering
- PE8 Products and Processes Engineering
- PE9 Universe Sciences
- PE10 Earth System Science
- PE11 Materials Engineering

## Social Sciences and Humanities

- SH1 Individuals, Markets and Organisations
- SH2 Institutions, Governance and Legal Systems
- SH3 The Social World and Its Interactions
- SH4 The Human Mind and Its Complexity
- SH5 Texts and Concepts
- SH6 The Study of the Human Past
- SH7 Human Mobility, Environment, and Space
- SH8 Studies of Cultures and Arts



## PE1 Mathematics

All areas of mathematics, pure and applied, plus mathematical foundations of computer science, mathematical physics and statistics

- PE1\_1 Logic and foundations
- PE1\_2 Algebra
- PE1\_3 Number theory
- PE1\_4 Algebraic and complex geometry
- PE1\_5 Lie groups, Lie algebras
- PE1\_6 Geometry and global analysis
- PE1\_7 Topology
- PE1\_8 Analysis
- PE1\_9 Operator algebras and functional analysis
- PE1\_10 ODE and dynamical systems
- PE1\_11 Theoretical aspects of partial differential equations
- PE1\_12 Mathematical physics
- PE1\_13 Probability
- PE1\_14 Mathematical statistics
- PE1\_15 Generic statistical methodology and modelling
- PE1\_16 Discrete mathematics and combinatorics
- PE1\_17 Mathematical aspects of computer science
- PE1\_18 Numerical analysis
- PE1\_19 Scientific computing and data processing
- PE1\_20 Control theory, optimisation and operational research
- PE1\_21 Application of mathematics in sciences
- PE1\_22 Application of mathematics in industry and society

# Europe Kicks Off "Champions' League" for Grants

Scientists welcome the new European Research Council but warn that it must remain independent

27 FEB 2007 • BY [MARTIN ENSERINK](#)

[doi: 10.1126/article.32596](https://doi.org/10.1126/article.32596)

“We [politicians] have to accept that research needs autonomy and freedom“

Angela Merkel

[ERC launch conference](#)



# Where can you find more information?

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## Videos - ERC Classes

- How the evaluation works
- What to consider before applying
- How to fill in the application
- The interview

## ERC Dashboard

- Search and export data on ERC projects

# Thank You!

More information: [erc.europa.eu](https://erc.europa.eu)



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