ERC AdG-2014

Roma – 30 Giugno 2014

Alberto ANFOSSI

ERC AdG…

…equilibrio tra tre dimensioni:

- **CV**
- **Progetto**
- **10-year track record**

ERC – Introduzione 1/3

- **Elemento distintivo** del 7° Programma Quadro per la Ricerca dell'UE
- Creato nel 2007 dall'UE per rafforzare la ricerca fondamentale in Europa e le opportunità per i migliori talenti scientifici
- Budget attuale – **7.5 Miliardi EUR per 7 anni** (2007-2013)
- Budget futuro – **13 Miliardi EUR per 7 anni** (2014-2020)
- Peer review internazionale
- Aperto a ricercatori provenienti da qualsiasi parte del mondo…

➔ **…** che intendono lavorare in Europa

European Research Council

Established by the European Commission

ERC – Introduzione 2/3

- Grant assegnati a **singoli** ricercatori
- **1 Progetto, 1 ricercatore, 1 istituto,**

  1 criterio di valutazione
- Unico criterio di selezione: **eccellenza**
- Borse sostanziose (2,5 M€ per Advanced grant)
- Nessuna priorità tematica pre-definita ('su iniziativa dei ricercatori' – **bottom-up**); aperto a **tutti i settori della scienza**
- No network e no-cofinanziamento
- Portabililtà del grant

*With the focus on the Principal Investigators, the concepts of the individual team is fundamentally different from that of a network or consortium of undertakings, universities, research centres or other legal entities. Proposals from such **consortia** should not be submitted to the ERC.*

European Research Council

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ERC – Introduzione 3/3

L'ERC offre:

- **Libera scelta** dell'area di ricerca,dell'istituzione ospitante e dei membri del team (europei e non)
- **Autonomia finanziaria** per 5 anni
- Possibilità di negoziare le migliori condizioni di lavoro con le istituzioni ospitanti
- Mobilità dei ricercatori ovunque in Europa (**portability of grants**)
- Un "marchio di qualità" per **attrarre finanziamenti aggiuntivi e ot riconoscimento**

European Research Council
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I bandi ERC 2014 in breve

	Starting Grant	*Consolidator Grant*	*Advanced Grant*
Publication date	11 December 2013	11 December 2013	17 June 2014
Deadline(s)	25 March 2014	20 May 2014	21 October 2014
Budget million EUR *(estimated number of grants)*	485 (370)	713 (400)	450 (200)
Planned dates to inform applicants	21 July 2014 21 November 2014	31 October 2014 15 January 2015	10 March 2015 28 April 2015

2015

315 – 340 - 285

PE panels 1/2

PE1 Mathematics
All areas of mathematics, pure and applied, plus mathematical foundations of computer science, mathematical physics and statistics.

PE2 Fundamental Constituents of Matter
Particle, nuclear, plasma, atomic, molecular, gas, and optical physics.

PE3 Condensed Matter Physics
Structure, electronic properties, fluids, nanosciences, biophysics.

PE4 Physical and Analytical Chemical Sciences
Analytical chemistry, chemical theory, physical chemistry/chemical physics.

PE5 Synthetic Chemistry and Materials
Materials synthesis, structure-properties relations, functional and advanced materials, molecular architecture, organic chemistry.

PE panels 2/2

PE6 **Computer Science and Informatics**

Informatics and information systems, computer science, scientific computing, intelligent systems.

PE7 **Systems and Communication Engineering**

Electronic, communication, optical and systems engineering.

PE8 **Products and Processes Engineering**

Product design, process design and control, construction methods, civil engineering, energy systems, material engineering.

PE9 **Universe Sciences**

Astro-physics/chemistry/biology; solar system; stellar, galactic and extragalactic astronomy, planetary systems, cosmology, space science, instrumentation.

PE10 **Earth System Science**

Physical geography, geology, geophysics, atmospheric sciences, oceanography, climatology, cryology, ecology, global environmental change, biogeochemical cycles, natural resources management.

Risultati 2007-2013 1/4

Call ERC	Budget [M€]	Proposals Evaluated	Funded	Success rate %	Success rate IT %	Average Grant [M€]
Starting Grant 2007	335	8.787	299	3,40	1,59	1,12
Starting Grant 2009	325	2.392	245	10,24	4,31	1,33
Starting Grant 2010	580	2.767	436	15,76	6,30	1,33
Starting Grant 2011	660	4.005	486	12,13	6,11	1,36
Starting Grant 2012	730	4.652	566	12,17	6,68	1,29
Starting Grant 2013 *	400	3.266	300	9,22	2,97	1,33
Consolidator Grant 2013	575	3.604	312	8,66	-	1,84
Totale Starting Grant	**3.605**	**29.473**	**2.644**	**8,97**	**3,28**	**1,36**
Advanced Grant 2008	517	2.034	282	13,86	6,83	1,83
Advanced Grant 2009	490	1.526	245	16,06	6,76	2,00
Advanced Grant 2010	590	1.967	271	13,78	8,13	2,18
Advanced Grant 2011	660	2.245	301	13,41	8,24	2,19
Advanced Grant 2012	680	2.269	319	14,06	5,34	2,13
Advanced Grant 2013	662	2.363	284	12,02	7,98	2,33
Totale Advanced Grant	**3.599**	**12.404**	**1.702**	**13,72**	**7,13**	**2,11**
Totale	**7.204**	**41.877**	**4.346**	**10,38**	**4,76**	**1,66**

Risultati 2007-2013 2/4

Nazione	*Tasso di successo [%]*	*No. progetti [Host Institution]*	*% progetti*	*Contributo finanziario €*	*% contributo finanziario*
GRAN BRETAGNA	13,96	849	22,3%	1.353.043.543	22,4%
GERMANIA	12,94	542	14,3%	914.746.816	15,2%
FRANCIA	15,72	480	12,6%	743.993.094	12,3%
OLANDA	14,36	313	8,2%	527.651.831	8,7%
SVIZZERA	22,95	286	7,5%	483.288.769	8,0%
ISRAELE	17,24	220	5,8%	334.254.457	5,5%
SPAGNA	7,08	203	5,3%	308.288.667	5,1%
ITALIA	4,76	210	5,5%	290.329.668	4,8%
SVEZIA	9,10	139	3,7%	231.535.503	3,8%
BELGIO	11,82	129	3,4%	184.985.110	3,1%
AUSTRIA	13,46	98	2,6%	148.673.877	2,5%
DANIMARCA	10,10	70	1,8%	117.201.285	1,9%
FINLANDIA	5,49	60	1,6%	93.546.575	1,6%
NORVEGIA	7,18	35	0,9%	66.406.327	1,1%
GRECIA	3,53	33	0,9%	48.912.195	0,8%
IRLANDA	6,08	32	0,8%	45.585.809	0,8%
UNGHERIA	7,61	32	0,8%	40.490.886	0,7%
PORTOGALLO	5,35	25	0,7%	37.742.631	0,6%
POLONIA	1,98	15	0,4%	18.256.936	0,3%
CIPRO	5,80	9	0,2%	12.999.766	0,2%
REP. CECA	3,15	7	0,2%	9.786.193	0,2%
TURCHIA	1,25	3	0,1%	4.990.540	0,1%
ESTONIA	6,52	3	0,1%	4.259.297	0,1%
CROAZIA	2,82	2	0,1%	3.254.897	0,1%
BULGARIA	2,07	3	0,1%	2.722.739	0,0%
ISLANDA	2,70	1	0,0%	2.399.634	0,0%
SLOVENIA	0,91	2	0,1%	1.999.082	0,0%
LETTONIA	3,45	1	0,0%	1.360.980	0,0%
SLOVACCHIA	1,06	1	0,0%	1.155.970	0,0%
TOTALE	10,78	3.803	100,0%	6.033.863.077	100,0%

Risultati 2007-2013 3/4

PE2 - Fundamental constituents of matter			
Call ERC	**Funded**	**IT**	**% IT**
Starting Grant 2007	-	-	-
Starting Grant 2009	11	0	0,00
Starting Grant 2010	24	3	12,50
Starting Grant 2011	28	2	7,14
Starting Grant 2012	32	5	15,63
Starting Grant 2013 *	15	2	13,33
Consolidator Grant 2013	19	1	5,26
Totale Starting Grant	**129**	**13**	**10,08**
Advanced Grant 2008	14	1	7,14
Advanced Grant 2009	12	3	25,00
Advanced Grant 2010	17	3	17,65
Advanced Grant 2011	19	1	5,26
Advanced Grant 2012	17	1	5,88
Advanced Grant 2013	18	1	5,56
Totale Advanced Grant	**97**	**10**	**10,31**
Totale	**226**	**23**	**10,18**

Risultati 2007-2013 4/4

AdG basati in Italia: 109

SubPanel	Title	Acronym	PI	HI	Grant
ID1	Molecular Nanotechnology for Life Science Applications: QUantitative Interactomics for Diagnostics, PROteomics and QUantitative Oncology	QUIDPROQUO	**Giacinto Scoles**	Udine	€ 2.979.700
ID1	Novel variation in plant breeding and the plant pan-genomes	NOVABREED	**Michele Morgante**	Udine	€ 2.473.500
ID1	Epigenetics and microRNAs in Myocardial Function and Disease	CARDIOEPIGEN	**Gianluigi Condorelli**	Humanitas Mirasole SPA	€ 2.500.000
ID1	Molecular mechanisms of the regulation of mammary stem cell homeostasis and their subversion in cancer	MAMMASTEM	**Paolo Di Fiore**	IFOM	€ 2.274.862
ID1	Optimization and inference algorithms from the theory of disordered systems: theoretical challenges and applications to large-scale inverse problems in systems biology	OPTINF	**Riccardo Zecchina**	Politecnico di Torino	€ 1.260.104
PE1	Analytic techniques for geometric and functional inequalities	ANTEGEFI	**Nicola Fusco**	Napoli Federico II	€ 600.000
PE1	Frobenius Manifolds and Hamiltonian Partial Differential Equations	FROM-PDE	**Boris Dubrovin**	SISSA	€ 864.000
PE1	Quasistatic and Dynamic Evolution Problems in Plasticity and Fracture	QUADYNEVOPRO	**Gianni Dal Maso**	SISSA	€ 968.500
PE1	Macroscopic laws and dynamical systems	MALADY	**Carlangelo Liverani**	Roma Tor Vergata	€ 1.372.720
PE1	Operator algebras and conformal field theory	OACFT	**Roberto Longo**	Roma Tor Vergata	€ 1.044.750
PE1	Phase transitions in random evolutions of large-scale structures	PTRELSS	**Fabio Martinelli**	Roma Tre	€ 1.248.067
PE1	Geometric Measure Theory in non-Euclidean spaces	GEMETHNES	**Luigi Ambrosio**	SNS Pisa	€ 749.800
PE1	Integral and Algebraic Points on Varieties, Diophantine Problems on Number Fields and Function Fields	DIOPHANTINE PROBLEMS	**Umberto Zannier**	SNS Pisa	€ 928.500
PE1	Complex Patterns for Strongly Interacting Dynamical Systems	COMPAT	**Susanna Terracini**	Torino	
PE10	AFRICA-GHG: The role of African tropical forests on the Greenhouse Gases balance of the atmosphere	AFRICA-GHG	**Riccardo Valentini**	Centro Euro-Mediterraneo per i cambiamenti climatici	€ 2.406.950
PE10	How long have human activities been affecting the climate system?	EARLYHUMANIMPACT	**Carlo Barbante**	Ca' Foscari Venezia	€ 2.370.767
PE2	**Low-background underground cryogenic installation for elusive rates**	**LUCIFER**	**Fernando Ferroni**	**INFN**	**€ 3.294.400**
PE2	**SOX: Short distance neutrino Oscillations with BoreXino**	**SOX**	**Marco PALLAVICINI**	**INFN**	**€ 3.451.600**
PE2	**The Electron Capture Decay of 163Ho to Measure the Electron Neutrino Mass with sub-eV sensitivity**	**HOLMES**	**Stefano Ragazzi**	**INFN**	**€ 3.057.067**
PE2	**Nano Photonics-Based Micro Robotics**	**PHOTBOTS**	**Diederik Wiersma**	**LENS**	**€ 2.200.000**
PE2	**Disorder physics with ultracold quantum gases**	**DISQUA**	**Massimo Inguscio**	**LENS**	**€ 2.500.000**
PE2	**Electron-scale dynamics in chemistry**	**ELYCHE**	**Mauro Nisoli**	**Politecnico di Milano**	**€ 2.446.200**
PE2	**Critical Phenomena in Random Systems**	**CRIPHERASY**	**Giorgio Parisi**	**Roma La Sapienza**	**€ 2.098.800**
PE2	**Electroweak Symmetry Breaking, Flavor and Dark Matter: One Solution for Three Mysteries**	**DAMESYFLA**	**Guido Martinelli**	**SISSA**	**€ 1.439.400**
PE2	**Quantum Gases Beyond Equilibrium**	**QGBE**	**Sandro Stringari**	**Trento**	**€ 1.638.560**

Risultati 2007-2013 4/4

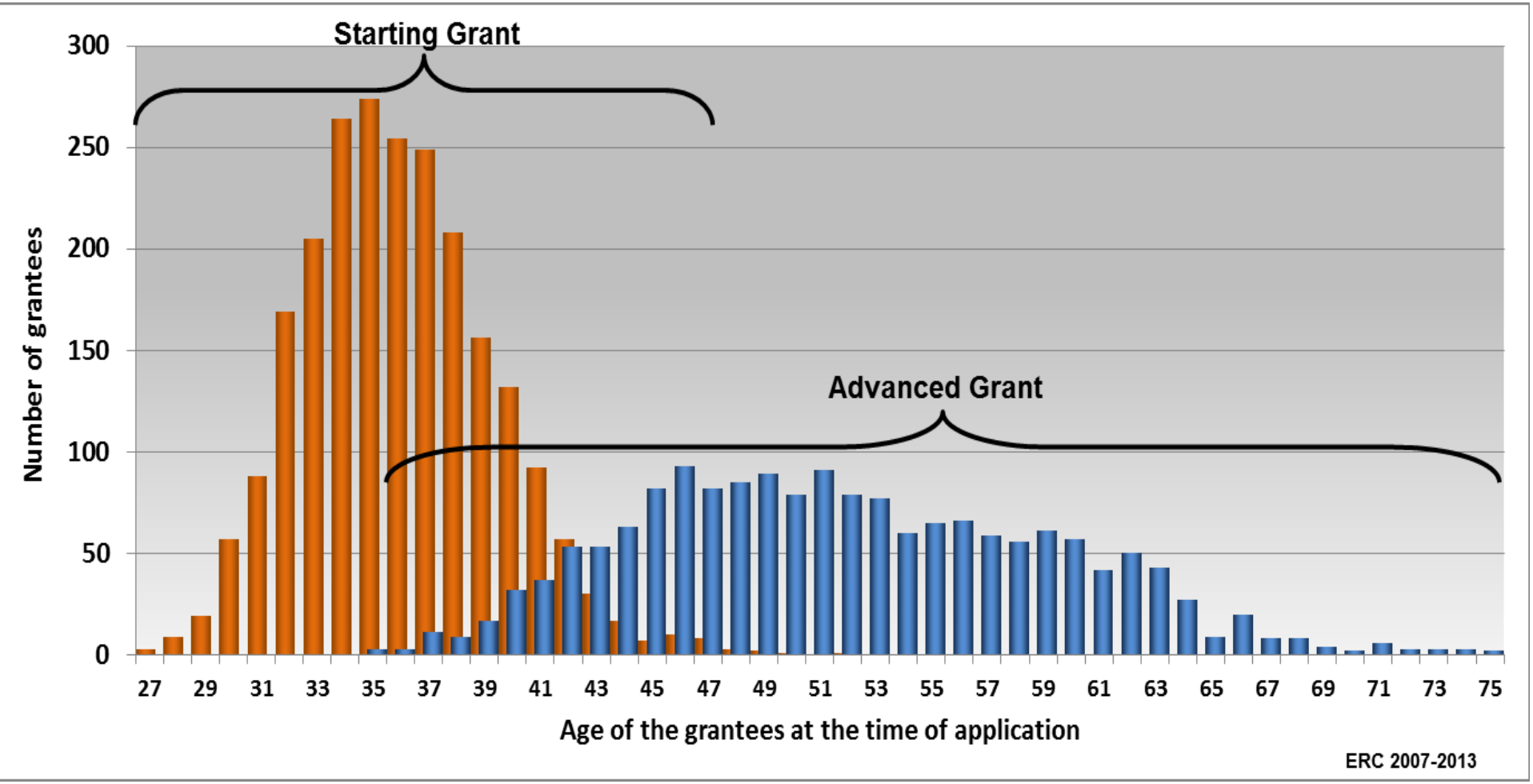
SubPanel	Title	Acronym	PI	HI	Grant
PE3	Sound-Light Manipulation in the Terahertz	SouLMan	**Alessandro TREDICUCCI**	CNR	
PE3	Modeling the Physics of Nano-Friction	MODPHYSFRICT	**Erio Tosatti**	SISSA	€ 1.550.000
PE3	Patchy colloidal particles: a powerful arsenal for the fabrication of tomorrow new super-molecules. A theoretical and numerical study of their assembly processes	PATCHYCOLLOIDS	**Francesco Sciortino**	Roma La Sapienza	€ 1.559.159
PE3	Molecular Nanomagnets at Surfaces: Novel Phenomena for Spin-based Technologies	MOLNANOMAS	**Roberta Sessoli**	Firenze	€ 2.269.200
PE4	Structure and dynamics of biomolecules by two-dimensional ultraviolet spectroscopy	STRATUS	**Giulio Cerullo**	Politecnico di Milano	€ 2.493.000
PE5	Neuron Networking with Nano Bridges via the Synthesis and Integration of Functionalized Carbon Nanotubes	CARBONANOBRIDGE	**Maurizio Prato**	Trieste	€ 2.500.000
PE5	Development of a Research Environment for Advanced Modelling of Soft matter	DREAMS	**Vincenzo Barone**	SNS Pisa	€ 2.152.600
PE5	Patterning the surface of monolayer-protected nanoparticles to obtain intelligent nanodevices	MOSAIC	**Fabrizio Mancin**	Padova	€ 1.499.000
PE6	Multiscale Thermal Management of Computing Systems	MULTIHERMAN	**Luca Benini**	Bologna	€ 2.483.397
PE6	Open intelligent systems for future autonomous vehicles	OFAV	**Alberto Broggi**	Parma	€ 1.751.066
PE6	Self-managing situated computing	SMSCOM	**Carlo Ghezzi**	Politecnico di Milano	€ 2.544.156
PE6	Search computing	SECO	**Stefano Ceri**	Politecnico di Milano	€ 2.500.000
PE6	Foundations for Software Evolution	LUCRETIUS	**John Mylopoulos**	Trento	€ 2.462.095
PE7	Robotic Dynamic Manipulation	RODYMAN	**Bruno Siciliano**	CREATE	€ 2.496.600
PE7	A Theory of Soft Synergies for a New Generation of Artificial Hands	SOFT HANDS	**Antonio Bicchi**	IIT	€ 2.279.600
PE8	Size effects in fracture and plasticity	SIZEFFECTS	**Stefano Zapperi**	CNR	€ 2.500.000
PE8	Isogeometric Methods for Biomechanics	ISOBIO	**Alessandro Reali**	Pavia	€ 1.195.200
PE8	New eddy-simulation concepts and methodologies for frontier problems in ...	NEWTURB	**Luca Biferale**	Roma Tor Vergata	€ 1.986.000
PE8	Instabilities and nonlocal multiscale modelling of materials	INSTABILITIES	**Davide Bignoni**	Trento	
PE8	Cavitation across scales: following Bubbles from Inception to Collapse	BIC	**Carlo Casciola**	Roma La Sapienza	
PE8	Multiscale modeling and simulation of biological and artificial locomotion at the micron scale: from metastatic tumor cells and unicellular swimmers to bioinspired microrobots	MicroMotility	**Antonio De Simone**	SISSA	€ 1.302.270
PE9	Star clusters as cosmic laboratories for Astrophysics, Dynamics and Fundamental Physics	COSMIC-LAB	**Francesco Ferraro**	Bologna	€ 1.880.000
PE9	ILLUMINATING DARK ENERGY WITH THE NEXT GENERATION OF COSMOLOGICAL REDSHIFT SURVEYS	DARKLIGHT	**Luigi Guzzo**	INAF	€ 1.723.600

Criteri di ammissibilità

	Starting Grant	Consolidator Grant	Advanced Grant
Specific Eligibility Criteria	Principal Investigator shall have been awarded his/her first PhD ≥ 2 and ≤ 7 years prior to the publication date of the call for proposals of the ERC Starting Grant	Principal Investigator shall have been awarded his/her first PhD > 7 and ≤ 12 years prior to the publication date of the call for proposals of the ERC Consolidator Grant	none

Maternità: 18 mesi per figlio fino a un massimo di 3 figli
Paternità: durata effettiva del congedo
Malattia: durata effettiva

Età dei PI


Starting Grant
Advanced Grant
Number of grantees
300
250
200
150
100
50
0
27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69 71 73 75
Age of the grantees at the time of application
ERC 2007-2013

Vincoli 2014

- *A Principal Investigator may submit only one proposal to the ERC for ERC frontier research grant calls made under the same Work Programme.*
- *A Principal Investigator whose proposal was evaluated as **category C** in the Starting, Consolidator or Advanced Grant calls for proposals under Work Programme 2013 may not submit a proposal to the Starting, Consolidator or Advanced Grant calls for proposals made under Work Programme 2014.*
- *A researcher may participate as Principal Investigator or Co-Investigator[14] in only one ERC frontier research project at any one time[15];*
- *A researcher participating as Principal Investigator in an ERC frontier research project may not submit a proposal for another ERC frontier research grant, unless the existing project ends[16] no more than two years after the call deadline;*
- *A Principal Investigator who is a serving Panel Member for a 2014 ERC call or who served as a Panel Member for a 2012 ERC call may not apply to a 2014 ERC call for the same type of grant[17].*

Vincoli 2015

As a result of very high and rising demand for ERC grants the Scientific Council has decided to extend the above restrictions in future as follows:

- *A Principal Investigator whose proposal is evaluated as **category C** in the Starting, Consolidator or Advanced Grant calls for proposals under Work Programme 2014 may not submit a proposal to the Starting, Consolidator or Advanced Grant calls for proposals made under Work Programme 2015 and 2016.*

- *A Principal Investigator whose proposal is finally evaluated as **category B** in the Starting, Consolidator or Advanced Grant calls for proposals under Work Programme 2014 may not submit a proposal to the Starting, Consolidator or Advanced Grant calls for proposals made under Work Programme 2015.*

These restrictions are designed to allow unsuccessful Principal Investigators the time necessary to develop a stronger proposal.

Condizioni al contorno

	Starting Grant	Consolidator Grant	Advanced Grant
Max EU contribution [€]	**1.500.000** (+500.000)	**2.000.000** (+750.000)	**2.500.000** (+1.000.000)
Year max	5	5	5
Effort	> 50%	> 50%	> 30%

Il progetto

B.1 [1 pdf to be uploaded]

- Cover page: Tile, Acronym, Abstract, Panel, key words, interdiscip.?
- Extended synopsys [Max 5 pages]
- CV [Max 2 pages]
- Funding ID [no page limit] NEW
- Track record [Max 2 pages]

B.2 [1 pdf to be uploaded]

- Scientific proposal [Max 15 pages]
  - State of the art and objectives
  - Methodology
  - Resources (incl. Budget table)
  + Ethical issues table

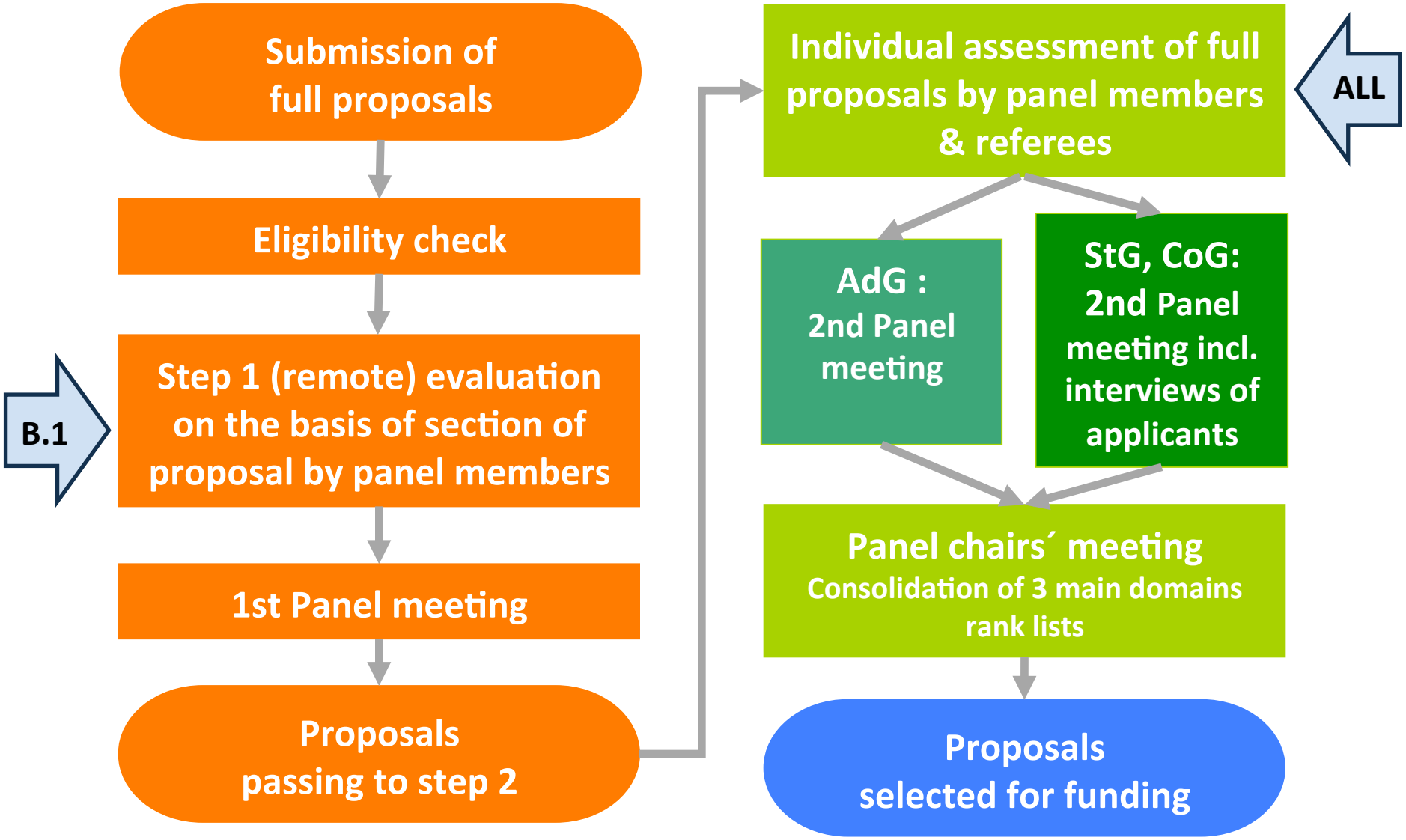
A [online only]

- A.1: proposal and PI info
- A.2 HI infos
- A.3 Budget

Annexes [pdfs to be uploaded]

- **PhD award**
- Maternity leaves (birth certificates) and other support documents
- Ethical issues annex (if needed)
- **Support letter of the HI**

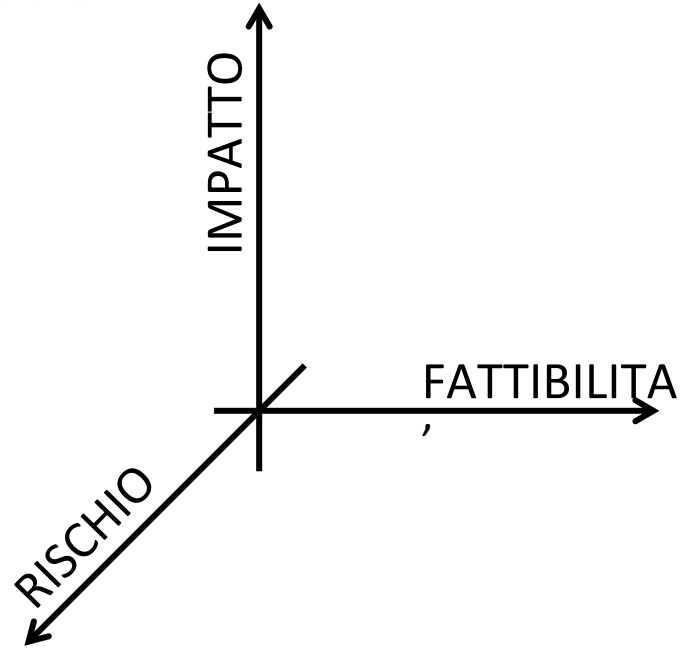
Il processo di valutazione



Il processo di valutazione

1. Al primo step **l'unico elemento di valutazione** sul progetto è il **B.1** Val={A,B,C}
2. Il primo step di valutazione coinvolge **solo i panel members**
3. Già dopo il primo step esiste una classifica
4. Al secondo step intervengono i **revisori esterni**
5. Per StG e CoG è prevista una sessione **orale**
6. La decisione finale è presa in **plenaria** dal panel Val={A,B}
7. L'ordinamento finale definisce i progetti finanziati, tra quelli valutati {A, A}
8. I primi esclusi: *reserve list*. Probabile rientrare grazie ai meccanismi di finanziamento associati alle nazioni non EU che partecipano a ERC (NO, IS, IL, TR, …)

L'Idea progettuale



IMPATTO:

- *ground-breaking research*
- *change the paradigms of the discipline*
- *pioneering proposals*
- *at the frontiers of knowledge*
- *set inspirational targets*

RISCHIO:

- *high-risk /high-gain projects*
- *unconventional innovative approaches*

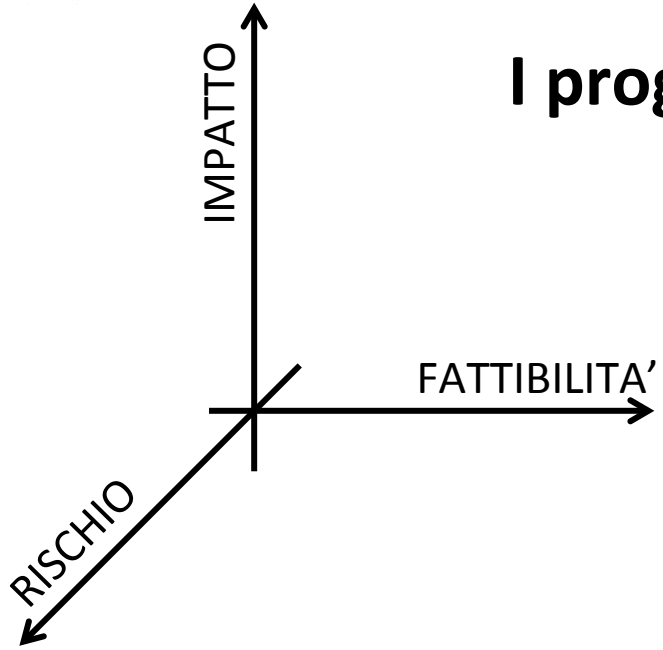
FATTIBILITA':

- *excellent investigators*
- *scientific excellence is the sole criterion*

FATTIBILITA' VS RISCHIO:

- **NO** al **rischio «di partenza»** (eg. disponibilità dati, accesso ad apparecchiature, selezione di un team totalmente ex novo, prima volta nella gestione di risorse ingenti, coordinamento di più sedi di lavoro, cv «leggero», poca indipendenza PI, …)
- **SI** al **rischio «di arrivo»** (i valutatori sanno che un programma di ricerca a 5 anni ha una probabilità di deviazione che cresce più che linearmente con il tempo)

L'Idea progettuale



I progetti ad alto rischio sono apprezzati,

ma è necessario spiegare:

che si è consapevoli dei rischi

come li si vuole affrontare

I potenziali benefici in termini di impatto

risultati intermedi interessanti

L'Idea progettuale

Prima di iniziare a scrivere, domande:

- Perché adesso è il momento giusto?
- Perché io sono la persona giusta?
- Perché l'ERC?
- Questa idea è fattibile? Quali sono i mei assets?
- Siamo nel 2019 a progetto terminato. Tutto è andato (ragionevolmente) bene. Cosa è cambiato nella mia disciplina? L'impatto è questionabile o un qualunque collega (di settori vicini) riconoscerebbe il valore di tale impatto?
- E' valso i soldi impegnati? Soldi pubblici? Il tuo tempo?

Titolo & Acronimo

Sono i «biglietti da visita» della proposta: da scegliere con attenzione

Ma… nessuna proposta verrà mai scartata perché l'acronimo è brutto!

Consigli sul **titolo**:

1. breve
2. Focalizzato
3. Il messaggio più interessante (impatto) prima

Cryogenic wide-Area Light Detectors with Excellent Resolution

Crystal channelling to extract a high energy hadron beam from an accelerator machine

Electroweak Symmetry Breaking, Flavor and Dark Matter: One Solution for Three Mysteries

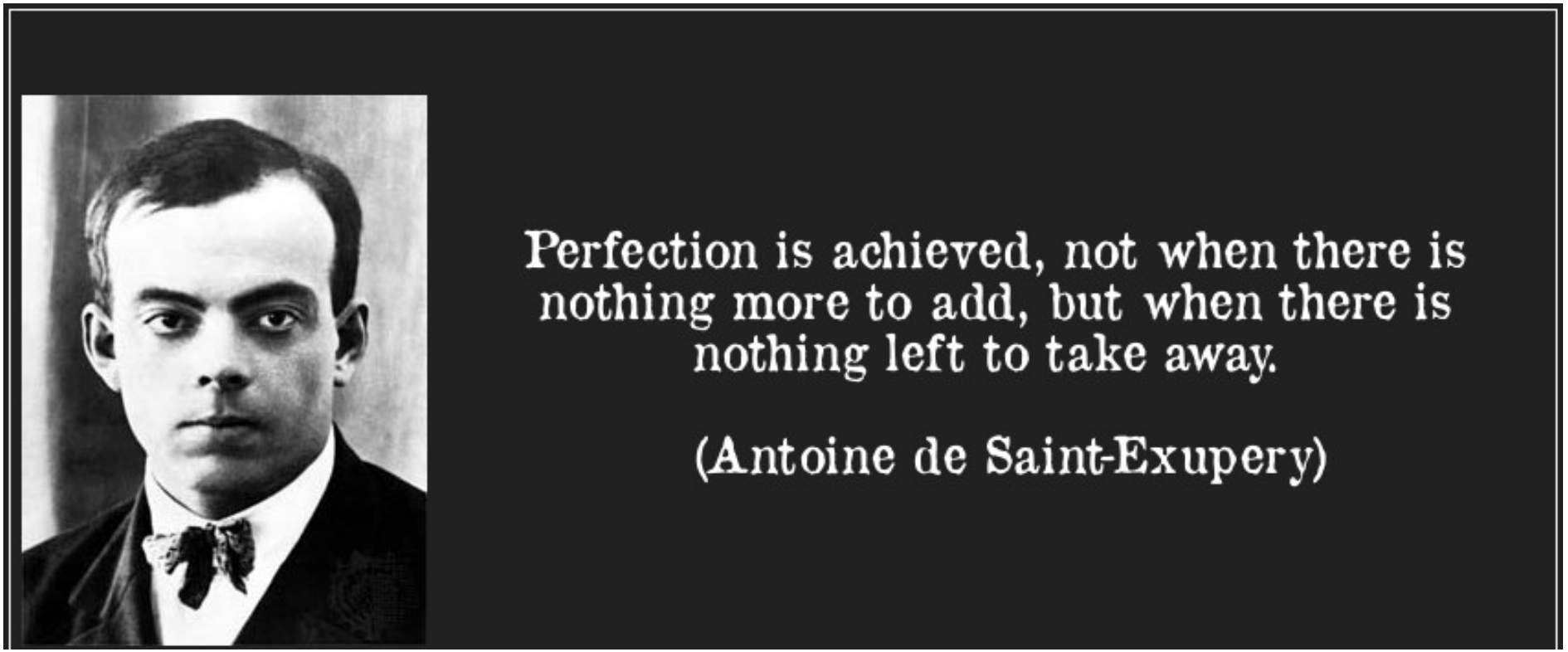
Consigli sulla scelta dell'**acronimo**:

1. Semplice
2. Corto
3. Non necessariamente evocativo
4. Non generico (più un nome proprio

stardust2asteroids
HSCsforLSDbrain
HIV LTR G-4
Hairy Cell Leukemia

L’abstract

2.000 caratteri, spazi e punteggiatura inclusi.



L'abstract

E' la prima parte che viene letta e usata dal Panel Chair per indirizzare il progetto ai Panelist (insieme alle parole chiave) e successivamente ai revisori esterni

dall'abstract i panelist decidono già se sono interessati a leggere il resto

Non è un abstract di un paper scientifico

La prima frase dovrebbe contenere il messaggio principale. Lo stato dell'arte dopo.

"We propose to realize an experiment sensitive to a large fraction of the parameter space for short distance neutrino flavour oscillations into sterile components. The experiment aims at the clear and unambiguous discovery, or at the definitive disproof, of the so called neutrino anomalies, a set of circumstantial evidences of electron neutrino disappearance at short distance from the source observed by several experiments".

«HOLMES is aimed at directly measuring the electron neutrino mass using the electron capture (EC) decay of 163Ho.»

«The general goal is to bring together different fields of research in order to create a new research area of photonic micro robotics. »

L'abstract

The **ultimate goal** of 4DHPT is to establish a new paradigm for space-time particle tracking. Presently, precise tracking devices determine time **quite poorly** while good timing devices are **too large** for accurate position measurement. This fact is imposing **severe limitations** on the potential of **many applications** ranging from medical PET to mass spectroscopy or particle tracking.

Unif. Concept

Problema

Idea allargata

We plan to eliminate this constrain by conceiving a single device able to concurrently measure with state-of-the-art precision the space (~ 10 micrometre) and time (~ 10 picosecond) coordinates of a particle. **Basing on existing results** on detector properties it will be possible to improve the timing characteristics of silicon-based pixel sensors, which already have sufficient position resolution, to the extend that a four-dimensional high-precision measurement can be achieved.

Il progetto

Fattibilità

In addition to the development of 4D sensors, the project proposes the development of the integrated read-out electronics necessary to obtain, at the end of the grant, a completely functioning system. The design of the electronics has to overcome **significant challenges** as the spatial and time resolution requirements can be met only with a fully integrated VLSI design that matches the size of the read-out to the area of the pixel sensors.

Goal intermedi

High risk

This research is **poised to open up a range of new opportunities** to applications that benefit from the combined position and timing information. For example, 4DHPT detectors allow obtaining sharper PET images, monitoring more accurately the dose delivered in cancer treatment and simplifying particle tracking in high-energy physics experiments.

High gain

Intediscip.

L’abstract

The general goal is to bring together different fields of research in order to create a new research area of photonic micro robotics. That is to create, study, and implement truly microscopic structures with nano scale accuracy that can perform robotic tasks and that are entirely powered and controlled by light**.**

This idea brings immense challenges both from the point of view of the physics involved as well as the chemistry needed to create the appropriate materials, but if successful **can also have a huge impact**.

To achieve this, we will combine our expertise on complex photonic materials and direct laser writing, to create micro structured patterns in liquid crystal elastomers, which are rubber-like polymers with liquid crystalline properties that can be triggered with light. In our view, this opens up a new strategy to create robots of various kinds, on a truly micrometer length scale. That is, micro robots that can swim, walk, or crawl, and when at destination perform specific tasks, controlled and driven by light. This proposal, in the first instance, deals with fundamental, curiosity-driven research and wishes to address the wealth of physics and chemistry that arises when combining nano photonics with micro robotics. Having said that, **the range of potential applications is very broad**. Our photonic micro robots would be able to penetrate otherwise difficult to access environments and perform tasks such as sensing or sampling. They could be made in large quantities which means they could also be put into action collectively in swarms (using mechanical and/or optical interaction between the individual robots). **The project is truly interdisciplinary**, which makes it very challenging but also exciting. The photonic micro robotic structures will be created by bringing together concepts from physics and chemistry, while the inspiration for designs comes partly from biology and potential applications can be foreseen in medicine.

L'abstract

This project aims to get a theoretical understanding of the most important large-scale phenomena in classical and quantum disordered systems.
Thanks to the renormalization group approach the critical behaviour of pure systems is under very good control; however disordered systems are in many ways remarkably peculiar (think for example to non-perturbative phenomena like Griffiths singularities), often the conventional approach does not work and many crucial issues are still unclear. **My work aims to fill this important hole** in our understanding of disordered systems. I will concentrate my efforts on some of the most important and studied systems, i.e. spin glasses, random field ferromagnets (that are realized in nature as diluted antiferromagnets in a field), Anderson and Mott localization (with possible experimental applications to Bose-Einstein condensates and to electron glasses), surface growth in random media (KPZ and DLA models). In this project I want to pursue a new approach to these problems. I aim to compute in the most accurate way the properties of these systems using the original Wilson formulation of the renormalization group with a phase space cell analysis; this is equivalent to solving a statistical model on a hierarchical lattice (Dyson-Bleher-Sinai model). This is not an easy job. In the same conceptual frame we plan to use simultaneously very different techniques: probabilistic techniques, perturbative techniques at high orders, expansions around mean field on Bethe lattice and numerical techniques to evaluate the critical behaviour. I believe that even this restricted approach is very ambitious, but that the theoretical progresses that have been done in unveiling important features of disordered systems suggest that it will be possible to obtain solid results.

L'extended synopsys

al primo step la synopsis è
l'unica fonte di informazione
sulla progetto

In **5 pagine**:
convincere i panelists in primis su
fattibilità e **innovazione**

incuriosire

L'extended synopsys

- deve essere rivolta principalmente a **ottimi scienziati** non esperti della propria nicchia
- deve essere autoconsistente, ***come progetto***
- fornire informazioni su:
  - ✓ obiettivi della proposta
  - ✓ superamento dello stato dell'arte
  - ✓ metodologia della ricerca
  - ✓ qualità del team
  - ✓ sostenibilità economica del progetto

- **«aiutare» il valutatore** nel proprio compito
- Trasmettere **chiarezza** di visione e di programmazione

Valutazione scientifica

1. Research Project

Ground-breaking nature, ambition and feasibility

Starting, Consolidator and Advanced

Ground-breaking nature and potential impact of the research project

To what extent does the proposed research address important challenges?

To what extent are the objectives ambitious and beyond the state of the art (e.g. novel concepts and approaches or development across disciplines)?

To what extent is the proposed research high risk/high gain?

Scientific Approach

To what extent is the outlined scientific approach feasible (based on the Extended Synopsis)?

To what extent is the proposed research methodology appropriate to achieve the goals of the project (based on the full Scientific Proposal)?

To what extent does the proposal involve the development of novel methodology (based on the full Scientific Proposal)?

To what extent are the proposed timescales and resources necessary and properly justified (based on the full Scientific Proposal)?

Il CV

CV scientifico, sintetico e schematico. Elementi essenziali (titoli):

1. PERSONAL INFORMATION
2. EDUCATION
3. CURRENT POSITION
4. PREVIOUS POSITIONS
5. FELLOWSHIPS AND AWARDS
6. SUPERVISION OF PHD AND POSTDOCS (MENTORING ACTIVITY)
7. TEACHING ACTIVITY
8. ORGANIZATION OF SCIENTIFIC MEETINGS
9. INSTITUTIONAL RESPONSIBILITIES
10. COMMISSIONS OF TRUST (REFEREE, AB, …)
11. MEMBERSHIP OF SCIENTIFIC SOCIETIES
12. MAJOR COLLABORATIONS
13. CAREER BREAKS

- SCIENTIFIC OUTPUT: H-INDEX, # OF PUBLICATIONS, ….

- FUNDING ID

Il CV

Advanced Grant profile

Objectives

Advanced Grants are designed to support excellent Principal Investigators at the career stage at which they are already established research leaders with a recognised track record of research achievements. Applicant Principal Investigators must demonstrate the ground breaking nature, ambition and feasibility of their scientific proposal.

Principal Investigators for the prestigious ERC Advanced Grant are expected to be active researchers and to have a track record of significant research achievements **in the last 10 years** which must be presented in the application. There is little prospect of an application succeeding in the absence of such a record, which identifies investigators as exceptional leaders in terms of originality and significance of their research contributions.

Thus, in most fields, Principal Investigators of Advanced Grant proposals will be expected to demonstrate a record of achievements appropriate to the field and at least matching one or more of the following benchmarks:

10-year Track record

Consiglio: scrivere in prosa (sempre schematicamente)

Per paragrafi, ripercorrere i tratti essenziali della propria carriera

Essere fattuali, no overselling, «affermo, dimostro»

Qui vanno le pubblicazioni

(ii) My experience and understanding of LHC experiments led me naturally to **the development of radiation-hard sensors and electronics for the next generation of detectors**, to be installed during the LHC upgrade. In my invited talk at the 5th Hiroshima Conference in 2004 [7], I described the challenges the harsh radiation environment would bring and focused on the need to abandon the establish paradigms and move to different sensor materials and geometries. To facilitate the exchange of ideas across different experiments, I started in 2005 the Trento Workshop on the Advanced Silicon Radiation Detectors, which has contributed to the rapid progress of p-type and 3D sensors [8]. After my publication of a paper showing the advantage of p-type sensors [9], I organized a long-term campaign to develop n-on-p strip sensors (2004 – present) for the ATLAS Upgrade. Within the CERN RD50 collaboration I led a comparative study between n-type and p-type sensors, both for float zone (FZ) and magnetic Czochralski (MCZ) wafers. In my overview talk at the 2007 IEEE NSS/MIC [9] I argued that we should replace the radiation-"soft" p-on-n sensors used in the present ATLAS SCT with much more radiation-hard n-on-p sensors. My studies of both surface and bulk radiation effects on a large-scale prototype confirmed the advantage of new p-type sensors [11].

[7] H. Sadrozinski, "Tracking Detectors for the LHC Upgrade, 5th Hiroshima Meeting, Japan, 2004.

[8] "Trento" Workshop on Advanced Silicon Radiation Detectors (3D and P-type Technologies), seven workshops from 2005 to 2012 http://indico.cern.ch/conferenceDisplay.py?confId=161493

[9] M. Bruzzi, H. Sadrozinski, A. Seiden, "Comparing radiation tolerant materials and devices for ultra rad-hard tracking detectors", Nucl.Instrum.Meth.A579:754-761,2007.

[10] H. Sadrozinski, "Development of Rad-Hard Tracking Detectors", 2007 IEEE NSS/MIC Symposium, Honolulu, HI., Oct 2007

[11] Y. Unno, H. Sadrozinski et al., "Development of n-on-p silicon sensors for very high radiation

Valutazione PI

Advanced

Intellectual capacity and creativity

To what extent has the PI demonstrated the ability to propose and conduct ground-breaking research?

To what extent does the PI provide evidence of creative independent thinking?

To what extent have the achievements of the PI typically gone beyond the state-of-the-art?

To what extent has the PI demonstrated sound leadership in the training and advancement of young scientists?

Commitment

To what extent does the PI demonstrate the level of commitment to the project necessary for its execution and the willingness to devote a significant amount of time to the project (min 30% of the total working time on it and min 50% in an EU Member State or Associated Country) (based on the full Scientific Proposal).

B.2

Viene letto anche dai revisori esterni

a. State of the art and objectives

- Revisione della letteratura e inquadramento del progetto (3 pag)
- Elenco preciso degli obiettivi del progetto (1 pag)

b. Methodology

- Descrizione di cosa si intende fare, come si intende procedere, risultati intermedi, …
- (opz.) Gantt chart o altra indicazione dello sviluppo temporale del progetto

c. Resources to be committed (including budget table)

- C.1 «The team», includendo le istituzioni coinvolte
- C.2 Budget table: gli €
- C.3 Budget details: voce per voce, spiegare origine delle cifre.