Il pilastro Excellent Science:

ERC & FET

Pavia – 22 Gennaio 2014

Alberto ANFOSSI

ERC

Grazie a

ERC grantees INFN, in particolare:

Marco Pallavicini, Marco Vignati, Luca Cavoto,
Angelo Nucciotti + Stefano Ragazzi,
Livia Conti, Fernando Ferroni

Servizio fondi esterni INFN

Bruno Quarta & CSTF Università di Torino

Giorgio Parisi, Enzo Marinari, Riccardo Zecchina

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** **STOP !**
- Borse sostanziose (1,5 Milioni di Euro per Start 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 ottenere riconoscimento**
- Procedure semplici e burocrazia "leggera"

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

Risultati 2007-2013

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

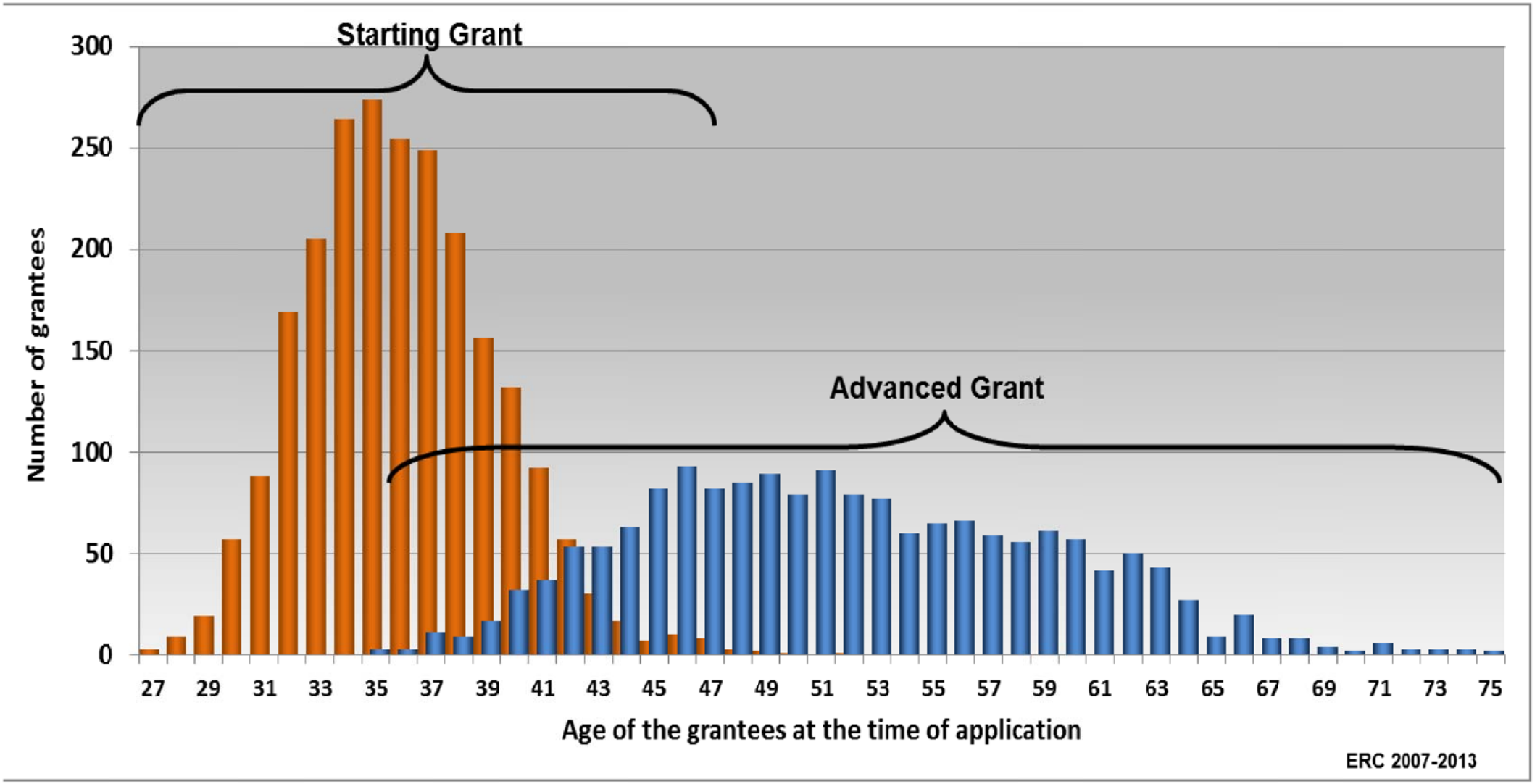
PE2 - Fundamental constituents of matter			
Call ERC	**Funded**	**IT**	**% IT**
Starting Grant 2007	-	-	-
Starting Grant 2009	11	0	0,00
Starting Grant 2010	24	3	12,50
Starting Grant 2011	28	2	7,14
Starting Grant 2012	32	5	15,63
Starting Grant 2013 *	15	2	13,33
Consolidator Grant 2013	19	1	5,26
Totale 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**

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%

Preliminare

Verificare il database dei progetti ERC finanziati, sezione ***«funded projects»***

http://erc.europa.eu

Scaricare il materiale informativo specifico e i templates («available soon…»)

http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/55-erc-stg-2014.html

Calcolare bene i temi e iniziare al più presto!

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

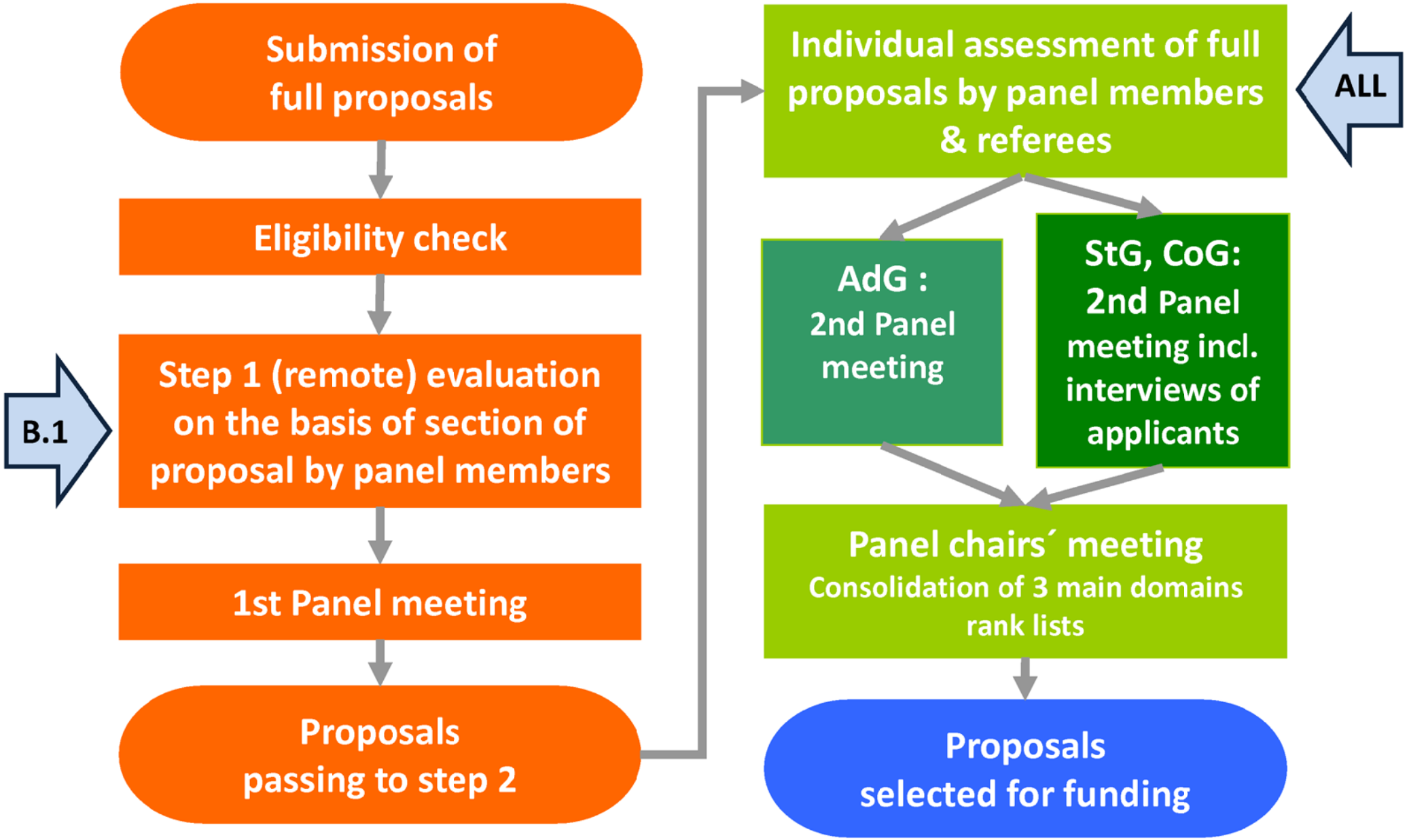
A [online only]

- 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 (CH, 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*

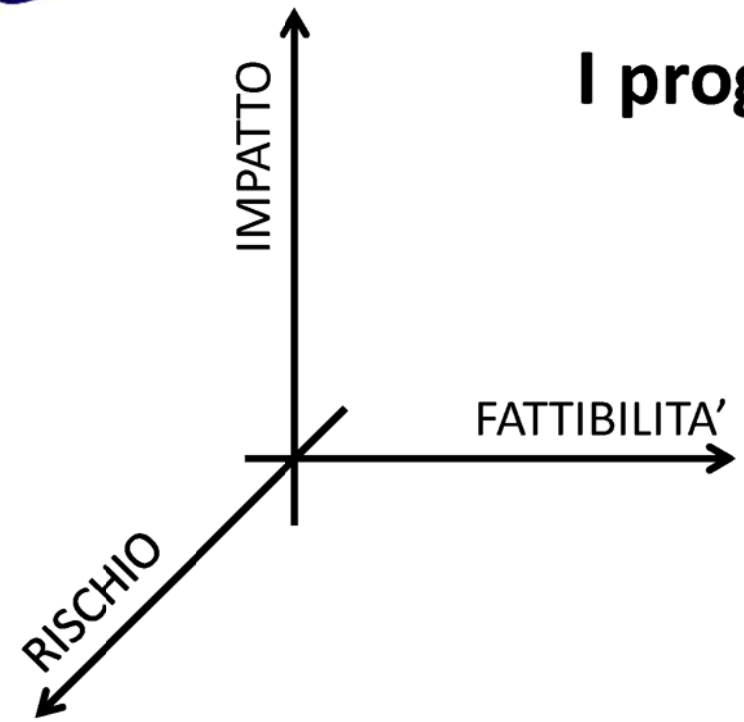
FATTIBILITA':

- *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, rispondiamo a queste domande:

- Perché questo progetto? A chi interessa?
- Quanto è nuova l'idea?
- 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?

OPINIONI ESTERNE

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.

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.

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.

*"A new generation of **parasitic beam extraction** of high energy particles from an accelerator is proposed in **CRYSBEAM**. "*

*"**The goal of my project is** to achieve a comprehensive characterization of the medium (a Quark-Gluon Plasma) produced in high-energy nucleus-nucleus (AA) collisions, developing tools for the study of soft observables (relativistic magneto-hydrodynamic codes) and of heavy flavour (transport codes) in heavy-ion experiments. The project will allow a cross-fertilization between the astrophysicists and the nuclear physicists involved in the program and will occur in phase with the parallel experimental effort in the heavy-ion detector upgrades."*

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.

Impatto

Intediscip.

L'abstract

A new generation of **parasitic beam extraction** of high energy particles from an accelerator is proposed in **CRYSBEAM**. Instead of massive magnetic kickers, **bent thin crystals trapping** particles within the crystal lattice planes are used. This type of beam manipulation opens new fields of investigation of fundamental interactions between particles and of coherent interactions between particles and matter. An experiment in connection to **Ultra High Energy Cosmic Rays study** in Earth's high atmosphere can be conducted.

Several TeV energy protons or ions are **deflected** towards a chosen target by the bent lattice planes only when the lattice planes are **parallel** to the incoming particles direction.

The **three key ingredients** of **CRYSBEAM** are:

- a **goniometer** based on **piezoelectric** devices that **orients** a **bent** finely-polished low-miscut **silicon crystal** with a high resolution and repeatability**,** monitoring its position with synthetic **diamond** sensors. Novel procedures in *crystal manufacturing* & *testing* and cutting-edge mechanical solutions for *motion technology in vacuum* are developed;

- a **silica screen** that **measures** the deflected particles via Cherenkov radiation emission in micrometric optical waveguides. These are obtained with **an ultra-short laser** micro-machining technique as for photonic devices used in *quantum optics* and *quantum computing*. The screen is a direct beam-imaging detector for *a high radiation dose environment*;

- a **smart absorber,** which simulates **the Earth's atmosphere,** where particles are **smashed** and secondary showers are initiated. This sets the path to *measure hadronic cross sections* at an energy relevant for *cosmic rays* investigation.

The R&D for the various components of such a system are carried out within this project and direct tests at CERN Super Proton Synchrotron to be performed prior to the final installation in the **Large Hadron Collider** at CERN are proposed. **A new concept of particle accelerator operations will be finally set in place.**

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

L'extended synopsys

CALDER:

- Introduction
- CUORE and LUCIFER
- *Present light detectors: NTD and TES sensors*
- *Goal of the project*
- *Strategy*
- *Know How and resources*
- *Key references*

Know-how and Resources

The project involves two institutions, the Department of Physics of Sapienza Università di Roma, hosting the PI, and Laboratori Nazionali del Gran Sasso of INFN. This combination will ensure the know-how and the resources required for the success of the project. Several instruments are already present in both institutions, allowing us to concentrate the fundings on the personnel.

The team members have experience in different fields: particle physics, superconductor physics and astrophysics/cosmology. The sharing of knowledge, in fact, is a key point for the success of this project: the transfer of the KID technologies from astronomy to particle physics and rare event searches. The variety of competences will allow to face positively the problems posed by the stated objectives.

Sapienza will contribute with the electronics laboratories and instrumentation that is already being used for the development of KIDs for astrophysical research. We will also have exclusive access to a laboratory hosting a dilution refrigerator with a base temperature of 10 mK. This cryostat features the same characteristics of the one used by CUORE and LUCIFER at LNGS and will allow us to perform tests in the same experimental conditions.

For the production of the light detectors we have already received positive feedback from a third party, the Institute for Photonics and Nanotechnology of the Italian National Research Center (IFN-CNR), which is based in Rome. Their micro/nanofabrication facility allows one to carry out the whole production of KIDs of different dimensions and with various materials.

INFN will contribute with the CUORE and LUCIFER R&D facilities. We will have access to clean rooms, chemistry labs and to the cryostat currently being used for the R&D on TeO_2 and ZnSe bolometers.

Track record

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

Starting Grant profile

Objectives

ERC Starting Grants are designed to support excellent Principal Investigators at the career stage at which they are starting their own independent research team or programme. Applicant Principal Investigators must demonstrate the ground breaking nature, ambition and feasibility of their scientific proposal.

A competitive Starting Grant Principal Investigator must have already shown the potential for research independence and evidence of maturity. For example, it is expected that applicants will have produced **at least one important publication without the participation of their PhD supervisor.** Applicant Principal Investigators should also be able to demonstrate a promising track record of early achievements appropriate to their research field and career stage, including significant publications (as main author) in major international peer-reviewed multidisciplinary scientific journals, or in the leading international peer-reviewed journals of their respective field. They may also demonstrate a record of invited presentations in well-established international conferences, granted patents, awards, prizes etc.

II CV

Consolidator Grant profile

Objectives

ERC Consolidator Grants are designed to support excellent Principal Investigators at the career stage at which they may still be consolidating their own independent research team or programme. Applicant Principal Investigators must demonstrate the ground breaking nature, ambition and feasibility of their scientific proposal.

A competitive Consolidator Grant Principal Investigator must have already shown research independence and evidence of maturity. For example, it is expected that applicant Principal Investigators will have produced **several important publications without the participation of their PhD supervisor**. Applicant Principal Investigators should also be able to demonstrate a promising track record of early achievements appropriate to their research field and career stage, including significant publications (as main author) in major international peer-reviewed multidisciplinary scientific journals, or in the leading international peer-reviewed journals of their respective field. They may also demonstrate a record of invited presentations in well-established international conferences, granted patents, awards, prizes etc.

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:

II CV

- 10 publications as senior author (or in those fields where alphabetic order of authorship is the norm, joint author) in major international peer-reviewed multidisciplinary scientific journals, and/or in the leading international peer-reviewed journals and peer-reviewed conferences proceedings of their respective field;

- 3 major research monographs, of which at least one is translated into another language. This benchmark is relevant to research fields where publication of monographs is the norm (e.g. humanities and social sciences).

Other alternative benchmarks that may be considered (individually or in combination) as indicative of an exceptional record and recognition in the last 10 years:

- 5 granted patents;

- 10 invited presentations in well-established internationally organised conferences and advanced schools;

- 3 research expeditions led by the applicant Principal Investigator;

- 3 well-established international conferences or congresses where the applicant was involved in their organisation as a member of the steering and/or organising committee;

- International recognition through scientific or artistic prizes/awards or membership in well-regarded Academies or artefact with documented use (for example, architectural or engineering design, methods or tools);

- Major contributions to launching the careers of outstanding researchers;

- Recognised leadership in industrial innovation.

Track record

Consiglio: scrivere in prosa (sempre schematicamente)

Per paragrafi, ripercorrere i tratti essenziali della propria carriera

Essere fattuali, no overselling, «affermo, dimostro»

Qui metto 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

Starting and Consolidator

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?

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 50% of the total working time on it and min 50% in an EU Member State or Associated Country) (based on the full Scientific Proposal).

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.