

Descrizione di bandi ESA-ASI di potenziale interesse INFN

Simone Dell'Agnello (INFN-LNF)

Frascati -13 Luglio 2017

- Bandi ESA
 - (Small) Medium, Large Class
 - “New science ideas”
 - ITTs, RFIs
 - Altro:
 - Missioni ‘strategiche/opportunità’ (ExoMars)
 - Space Flagships (Galileo, Copernicus) e Bandi europei (H2020)
 - “What Next: Moon Village”

- Bandi ASI
 - Studi nazionali
 - Esempi: Bandi 2007
 - Recenti: Componentistica EEE
 - ASIF: Asi Supported Irradiation Facilities
 - Altro: “Open Calls” su COSMO-SkyMed (per PMI e Enti Ricerca)
 - Opportunità NASA-ASI

- Cosmic Vision 2015–2025 is the current cycle of ESA's long-term plan for space science missions. The programme includes **CHEOPS** (CHAracterizing ExOPlanet Satellite), a small (S-class) mission for launch in 2017
- **Solar Orbiter**, **Euclid**, and **PLATO** (PLANetary Transits and Oscillations of stars) three medium (M-class) missions (M1, M2, M3) with launch slots in the later part of this decade and early part of the next decade
- **JUICE** (Jupiter Icy Moons Explorer) & **ATHENA** (Advanced Telescope for High-ENERgy Astrophysics), two large (L-class) missions for launch in the 2020s (L1 & L2). The broad effort under the name of **LISA** (Laser Interferometer Space Antenna), after the discovery of Gravitational Waves and the success of LISA-PF selected as L3-mission. Launch in 2034

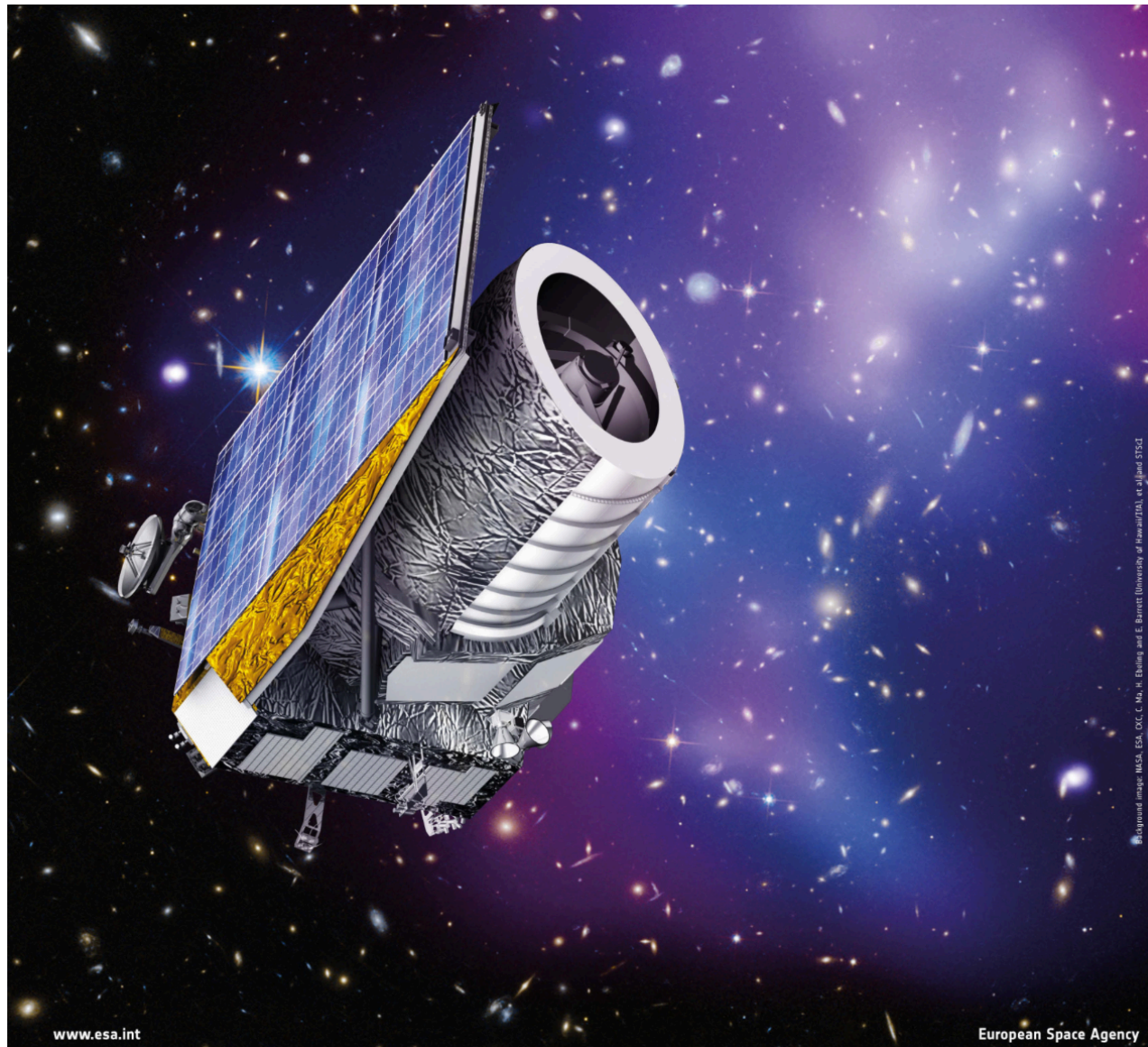
M-Class medium size missions





- Budget ~550 MEuro, Industrial Prime, typically european research-industry consortium
 - International partnerships allowed, but need strong endorsements
- Rocket and missions services offered by ESA as part of the call
 - Alternative launch services allowed; if so strong endorsement needed
- Scientific payload (instrument) typically to be sponsored by national agencies
 - Endorsements needed
- In later stages ESA to negotiate formally with endorsing entities
- **Solar Orbiter** (2017) and **Euclid** (2020) have been chosen as the two M-class missions, following a down-selection (to 3) and selection process

- Euclid is an ESA mission to map the geometry of the dark Universe. The mission will investigate the distance-redshift relationship and the evolution of cosmic structures by measuring shapes and redshifts of galaxies and clusters of galaxies out to redshifts ~ 2 , or equivalently to a look-back time of 10 billion years. In this way, Euclid will cover the entire period over which dark energy played a significant role in accelerating the expansion
- In December 2012, Astrium SAS (Toulouse) has been contracted to design and build the payload module, which includes the telescope and the accommodation for the instruments, which are to be delivered by the Euclid Consortium.
- Thales Alenia Space, was selected as the Prime Contractor, with the overall responsible for the building of Euclid satellite, in June 2013
- Supported in Italy by ASI
- Italian contacts: UniBO, INAF-OAR (Scaramella)
- INFN-CSN2 participates, but was not part of the original proposal

Euclid – M2



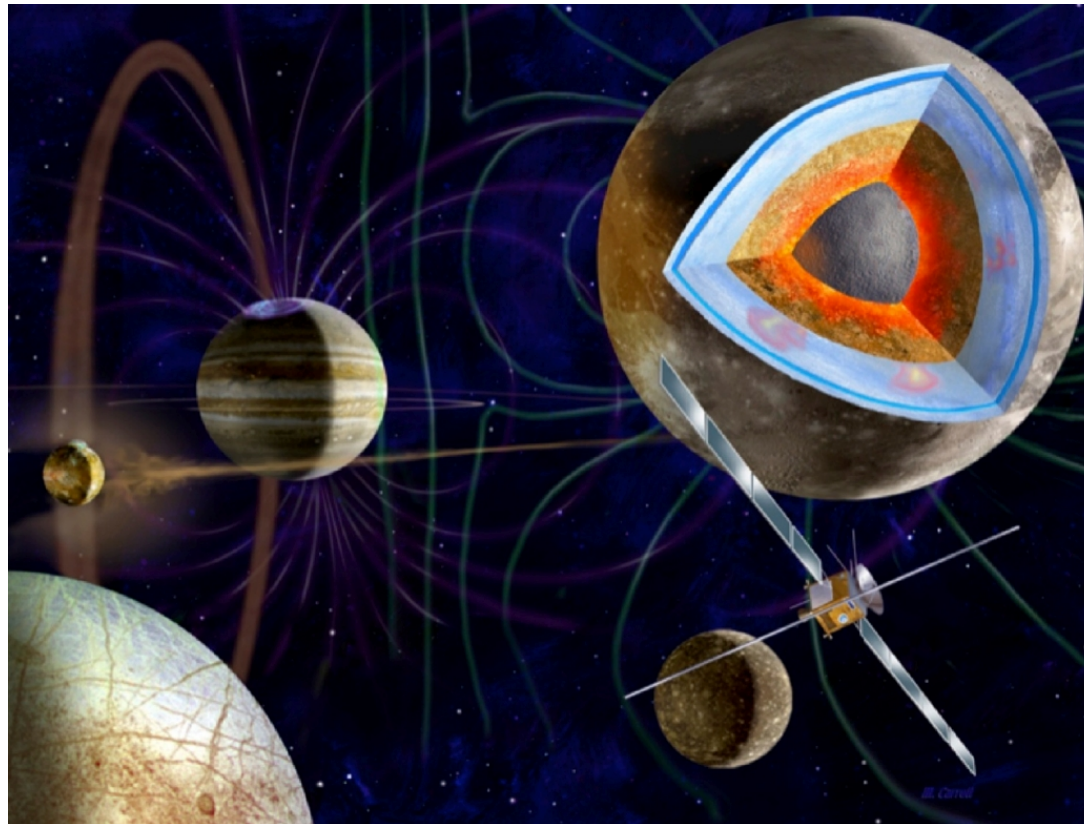
M4
Candidate missions under study



Exoplanets (ARIEL), plasma physics (THOR) and the X-ray Universe (XIPE) are the topics chosen by ESA to be considered for the fourth medium-class mission slot, for launch in 2026

JUICE, L-1

- L-class rules similar to M-class, budget ~1 GEuro
- JUICE - JUpter ICy moons Explorer - is the first large-class mission in ESA's Cosmic Vision 2015-2025 programme. Planned for launch in 2022 and arrival at Jupiter in 2030, it will spend at least three years making detailed observations of the giant gaseous planet Jupiter and three of its largest moons, Ganymede, Callisto and Europa





Call for new science ideas in ESA’s Science Programme

1 PURPOSE OF THE CALL

The process of calls for Medium (M) and Large (L) missions has demonstrated to be effective in selecting, by a bottom-up proposal approach and a peer review selection process, exciting new missions covering a wide range of scientific fields.

Through the present Call the Director of Science solicits from the broad scientific community proposals for the competitive selection of new “Science Ideas”, to be investigated in terms of feasibility and needed technology developments. Therefore, this Call is not intended at replacing future Calls for M or L missions, but aims at stimulating the emergence of new and innovative science ideas based on technologies not yet sufficiently mature, possibly to become potential candidates for future M or L mission Calls in the ESA Science Programme.

The present Call is open to science ideas in all areas of Space Science. No limitations to the science goals addressed are imposed on the proposals.

Esempio di proposta finale

The scientific motivation for this proposal is the attempt to identify hyperon formation on neutron stars looking for specific signatures of hypothetical exotic systems (exotic atoms like $(p\mu^-)$ or $(p\Sigma^-)$ and exotic nuclear clusters¹) in the spectra of the star.

We intend to follow a two-fold approach that involves studies typical of atomic and solid state physics on one side and nuclear and subnuclear methods on the other side.

Core team members:

Alessandro Drago, Physics and Earth Sciences Department, University of Ferrara and INFN Sezione di Ferrara, Via Savonarola 9, I-44121 Ferrara, Italy

Paolo Esposito, Anton Pannekoek Institute for Astronomy, University of Amsterdam, Postbus 94249, 1090 GE Amsterdam, The Netherlands

Paola Gianotti, Istituto Nazionale di Fisica Nucleare, Laboratori Nazionali di Frascati, Via E. Fermi 40, I-00044 Frascati, Italy

Carlotta Giusti, Physics Department, University of Pavia and INFN sezione di Pavia, Via A. Bassi 6, I-27100, Pavia, Italy

Diego Lonardoni, National Superconducting Cyclotron Laboratory, Michigan State University, 640 South Shaw Lane, East Lansing, MI 48824, USA and Theoretical Division, Los Alamos National Laboratory, Los Alamos, NM 87545, USA

Alessandro Lovato, Physics Division, Argonne National Laboratory, 9700 South Cass Avenue, Argonne, IL 60439, USA

Vincenzo Lucherini, Istituto Nazionale di Fisica Nucleare, Laboratori Nazionali di Frascati, Via E. Fermi 40, I-00044 Frascati, Italy

Francesco Pederiva, Physics Department, University of Trento and INFN-Trento Institute for Fundamental Physics and Application, via Sommarive 14, I-38123 Trento, Italy



Lead proposer:
Andrea Fontana,
INFN-Pavia

Participation



- Through S/M/L call websites
- In the framework of EU-wide proposal consortia
- Through endorsements of ASI, INFN, INAF, etc.
- ESA down-selection (typically to 3 Phase A studies)
 - Role of national delegations, several ESA boards
- Selection 3 to 1 → approval !
- Implementation:
 - Agreements with ESA and/or national Space Agencies
 - ESA Invitation To Tenders (ITTs) or Announcements of Opportunities (AOs) → EMITS
 - National Space Agencies' Announcements of Opportunities (AOs) or other forms of calls
 - In Italy: ASI agreements with research/academia/industrial entities
 - Participation to an L mission is a lifetime commitment
- M5 competition just started

EMITS (ITTs & AOs)



User: Guest

News

Procurement Review Board Announcements

Open Invitations to Tender

- Ordered by Open Date
- Ordered by Closing Date
- By Keyword
- Global List

Intended Invitations to Tender

Reference Documentation

ECOS Resources

How to do Business with ESA

To find Invitations to Tender issued by Entities other than ESA, select here **ENTITIES**

emits

→ INVITATIONS TO TENDER PUBLISHED

Hosted by ESA

Rel. 7.5.7.0

Non ci sono tipicamente gare/bandi “per rivelatori INFN”, tipo le Call di CSN5. Ma ITT/AO per missioni ESA approvate e/o in preparazione. Tipicamente ci si accede tramite la partecipazione ai Bandi S/M/L/EE

Other ESA initiatives/participations



- Earth Explorers Mission; EE-9 2017
 - Partecipazione ASI-INFN a proposta E-GRASP (geodesia spaziale) come JointLab Frascati/Matera
- Missioni strategiche/opportunità (ExoMars)
 - Contributi possibili anche dopo approvazione missioni (p. es. microriflettore LNF, INRRI) attraverso ASI
- Space Flagships (Galileo/EGNOS, Copernicus) e Bandi europei (H2020)
- “What Next: Moon Village”
- ITT, RFI (Request for Information)
- Proposte non sollecitate
 - Contratto servizio/R&D LNF per ESA/Galileo: ETRUSCO-IOV

- Studi nazionali
 - COFIS (COsmologia e FISica fondamentale), 2006-2007, PI = Paolo de Bernardis (Uni Roma1); partecipazione INFN e LNF
 - Astrofisica, f. fondamentale e astroparticelle, 2007-2008, PIs = Reno Mandolesi (INAF) e R. Battiston (INFN); partecipazione INFN, LNF
- Esempi passati: Bandi 2007
- Esempi recenti: Componentistica EEE
- ASIF: Asi Supported Irradiation Facilities
 - Aggiungere DAFNE-Luce; incluso e-cloud per qualifiche ESD (Electro-Static Discharge)
- Altro: ASI “Open Calls” su COSMO-SkyMed (per PMI e EPR)
- Opportunità NASA-ASI
- Non proprio Bandi, ma opportunità importanti: Premiali MIUR
 - Prima progetti specifici bottom up (LNF: LR2G, Galileo), ora top down
 - Un Premiale ASI 2012 convertito in Bando Tecnologico Nazionale

- **Piccole missioni (50 MEuro)**
 - MAGIA, PI = A. Coradini (INAF-IFSI), partecipazione LNF su fisica fondamentale con la Luna
 - Solo Fase A nel 2008/9, poi programma cancellato
- **Missioni opportunità (25 Meuro)**
 - Progetto rivelatori raggi X (INFN-Pisa, INAF-IASF; Bellazzini, Costa). Base di altre proposte come IXPE e XIPE
 - Solo Fase A nel 2008/9, poi programma cancellato
- **Progetti di Sviluppo Tecnologico (~30 Meuro)**
 - 164 proposte, 11 approvate; programma completato (2010-2015)
 - 1 INFN come Prime (LNF, ETRUSCO-2, riflettori per Galileo, nuova SCF test facility, ...); quarta proposta classificata su 164
 - 1 INFN come subco (INFN-Pisa), Prime = PMI (ingegnerizzazione imagers UV-X); undicesima proposta classificata su 164

Esito Bando “Progetti di Sviluppo Tecnologico”

ALLEGATO 1 PROPOSTE AMMISSIBILI GRADUATORIA DI MERITO

Protocollo 2008	Mittente	id apertura	Titolo	PUNTEGGIO
8379	CNR - IMM (Ist. Microelettronica e microsistemi)	32	SPAD - Single Photon avalanche diode per la lettura di fibre scintillanti	95
8469	Thales Alenia Space Italia SpA (Strada Statale Padana Superiore, 290)	92	Evoluzione tecnologica ricevitore integrato Galileo (ricevitore GNSS per applicazioni safety of life)	94,5
8596	Space Engineering S.p.A. (Via dei Berio 91)	28	DIVA	94
8464	INFN - Laboratori Naz. di Frascati (Via E. Fermi, 40)	67	ETRUSCO-Z Extraterrestrial ranging to unified satellite constellations	93,5
8551	DTM Srl (Via Tacito, 65) Modena	33	LAVE - lente per raggi gamma	93
8474	Thales Alenia Space Italia SpA (Strada Statale Padana Superiore, 290)	84	Sviluppi tecnologici nel millimetrico per missioni di polarizzazione	92,5
8354	Università di Bologna Dip. Elettronica Informatica	139	Amplificatori di potenza in GaN per applicazioni spaziali	92
8480	Thales Alenia Space Italia SpA (Via Saccomuro, 24)	12	Advanced Radar Processing Architecture	91,5
8589	Thales Alenia Space Italia SpA (Via Saccomuro, 24)	102	Sviluppo di tecnologie per tile di 2a generazione	91,5
8463	AVIO (Viale Garibaldi 22)	151	THESEUS - Thrusters evolution for space exploration and upper stages	91
8608	G&A Engineering (P.O. Box 59)	126	MAP - Multi Asic Pixel Imager - Sensore elettronico CMOS sensibile al singolo fotone per la banda visibile ultravioletta e X	90
8575	Ist Astrofisica Spaziale e Fisica Cosmica (Roma)	2	Sistema integrato di rivelazione di raggi X basato su dispositivi al silicio di nuova generazione ad alta risoluzione spettrale spaziale e temporale per Astronomia X	89,5
8568	ALTA SpA (Via A. Gherardesca, 5)	130	SPMM - Sistema di propulsione modulare multi-piattaforma	88,5
8512	INAF-IASF (Via del Fosso del Cavaliere, 100)	64	Sistema di raffreddamento e demagnetizzazione adiabatica per applicazioni spaziali	88

Bando Componentistica EEE



Componentistica Elettrica, Elettronica ed Elettromeccanica (EEE)

ESCC (European Space Components Coordination), <https://spacecomponents.org>

Nuove idee per la componentistica spaziale del futuro

Nuova scadenza: 20 febbraio 2017 - Pubblicato l'aggiornamento del format proposta economica -
Ultimo aggiornamento: 14 febbraio 2017

30 Novembre 2016

Il Bando denominato 'NUOVE IDEE PER LA COMPONENTISTICA SPAZIALE DEL FUTURO' ha l'intento di far emergere quegli sviluppi tecnologici **radicalmente innovativi**, attualmente a basso/bassissimo TRL presso laboratori, università, centri di ricerca nazionali e operatori industriali, in grado di garantire evoluzioni e applicazioni future nel settore spaziale. A partire infatti da una prima formulazione dell'idea (TRL 1) e concettualizzazione della tecnologia (TRL 2), i passi necessari per giungere fino alla qualifica spazio (TRL 7) sono molteplici e spesso complessi: è intenzione dell'ASI promuovere, con la presente iniziativa, lo sviluppo di progetti per la verifica di nuovi concetti tecnologici fino al raggiungimento di un TRL pari a 3 o 4 (in dipendenza del TRL di partenza) con dimostrazione di fattibilità sperimentale e realizzazione di un prototipo da laboratorio di tecnologie fortemente innovative, abilitanti per lo spazio.

Gli importi ammessi per ciascun contratto di finanziamento, **da quote minime fino** ad un massimo di € 300.000,00 per ciascun progetto, hanno lo scopo di favorire la nascita e lo sviluppo di tecnologie radicalmente innovative ed abilitanti per lo spazio utilizzabili nei futuri programmi spaziali dell'ASI, stimolare il salto tecnologico nel settore spazio favorendo una attività di mining di idee innovative negli ambiti istituzionali (università, enti di ricerca, etc..) ed in settori industriali anche differenti da quello spaziale e consolidare i ruoli di eccellenza presenti nelle aree ritenute critiche e strategiche per la comunità spaziale nazionale sia scientifica che industriale.

I termini per la presentazione delle proposte sono stati prorogati al 20 febbraio 2017, ore 12.00.

Altro: opportunità con NASA (ASI)

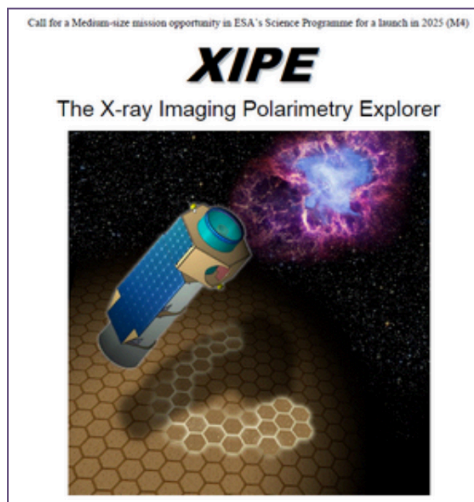


- NASA calls (similar to ESA S/M/L class)
 - Small Explorer, Discovery (~500M\$), New Frontiers (~1G\$); ...
 - Discovery: InSight, Mars Lander 2018 (microriflettore ASI/INFN, LaRRI)
- Strategic missions:
 - Mars 2020 Rover (microriflettore ASI/INFN, LaRA)
 - Resource Prospector (Lunar Rover 2020/21; LNF retroreflectors)
- IXPE is next in the line of Small Explorer missions. NASA's Goddard Space Flight Center in Greenbelt, Maryland, manages the Explorers Program. NASA's Marshall Space Flight Center in Huntsville, Alabama, leads the mission for the agency's Science Mission Directorate in Washington
- Participation through consortia, endorsements INFN, ASI; down/selections, NASA-ASI 'Implementing Arrangements'

IXPE (NASA-ASI) & XIPE (ESA-ASI)

XIPE e IXPE

Contesto internazionale



Lead Scientist: Paolo Soffitta (IAPS/INAF)

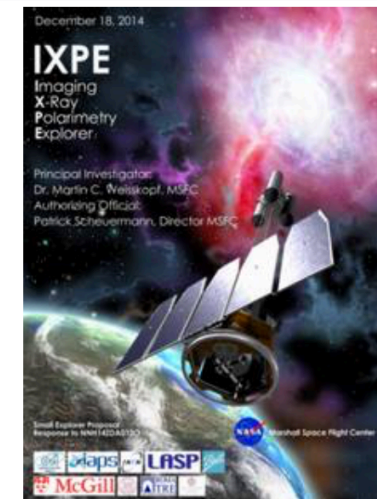
ESA M4.

Competitors:

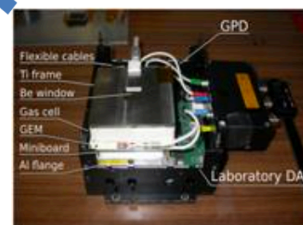
THOR: a mission to study turbulence on Solar Wind (A. Vaivads IRF/Sweden)

Ariel: a mission for the spectroscopy of Exoplanets G. Tinetti UCL/UK.
Decision in May/June 2017

3 missions of X-ray polarimetry now in competition between ESA and NASA



PI Martin Weisskopf @ MSFC/NASA



3 GPDs al fuoco di 3 ottiche per raggi X

NASA SMEX.

Competitors

PRAXYS: a Mission of X-ray Polarimetry based on TPC. PI K. Jahoda @ NASA/GSFC

SPHEREx: a Mission of All Sky Survey of NearIR spectroscopy. PI James Bock @ CalTech



IXPE mission, NASA teams with ASI

A cooperation between NASA and ASI to Probe Cosmic X-ray Mysteries. The agreement signed today at the Paris Air Show

by Redazione ASI

 Follow @asi_spazio

Tuesday 20 June 2017



A new partnership forged between **NASA** and **Italy's space agency** paves the way for a breakthrough mission to explore some of the most **turbulent and extreme environments in our universe** -- from the hottest, messiest star factories to violent jets screaming away from monster black holes.

Robert Lightfoot, **NASA's** acting administrator, signed an agreement June 20 with **Roberto Battiston**, president of the **Italian Space Agency (ASI)**, defining the terms of cooperation for the **Imaging X-ray Polarimetry Explorer (IXPE)** mission during a ceremony at the **Paris Air Show in Le Bourget**.

"**NASA** welcomes the opportunity to work with **ASI** on this mission, to build upon a history of **strong cooperation** between our agencies in the space sciences," said **Lightfoot**. "We wish all those working on IXPE great success in the years ahead, and we eagerly anticipate the scientific promise of this exciting space science mission."

"With this agreement Italy confirms to play a leading role in the scientific field of high energy studies," said **Battiston**. "This cooperation with NASA is the demonstration of the high standard of our work."

Published: 28 June 2017

IXPE NASA/SMEX

Contributo Italiano

Instrument

- Gas Pixel Detector (EM 3, FL)
- Filter Wheel + Cal Sources (E)
- Back End Electronics (EM, 3)
- P/L Computer (EM, 1 PFM)
- P/L Simulator
- Test Equipments

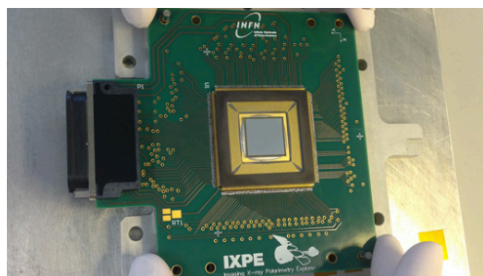
Attività:

Integrazione e test DU (INFN Pi)

Calibrazione Stand Alone (IAPS/INAF)

Partecipazione alla Calibrazione End-to-End (IAPS/INAF & INFN)

Partecipazione alla definizione degli obiettivi scientifici e all'analisi dei dati



È stato siglato l'accordo tra l'INFN e l'Agenzia Spaziale Italiana (ASI) per l'invio in orbita di innovativi rivelatori in grado di misurare la polarizzazione della radiazione X delle sorgenti celesti: una proprietà che finora è stata osservata solo nella brillante Nebulosa del Granchio

The agreement between INFN and the Italian Space Agency (ASI) has been signed for the launch of innovative detectors capable of

measuring the polarization of the X-ray radiation of the astrophysical sources: so far a property only observed in the brilliant Crab Nebula in 1972, due to the lack of sufficiently sensitive instrumentation.

This property is expected in many sources, and it is essential to understand, for instance, the geometry and magnetic field of black holes and neutron stars. The unique feature of the new GPD (Gas Pixel Detectors) is the combined use of a gas detector and a high resolution reading integrated circuit. The three GPDs, designed and built in the INFN laboratories in Pisa, will be the eyes of the Imaging X-ray Polarimetry Explorer (IXPE) telescope, the next mission of the Small Mission Explorers (SMEX) program, whose launch is scheduled for the end of 2020. For over ten years, INFN, the National Institute of Astrophysics (INAF) and ASI have been perfecting GPDs for applications in polarization measures for their use on dedicated satellites: every photon that arrives on the detector develops in the gas of the GPD a track whose direction, rebuilt thanks to the pixel sampling, is bound to the properties of polarization of the radiation. IXPE will provide for the first time a simultaneous measurement of source image, time and energy development of their X-ray emissions and polarization properties.