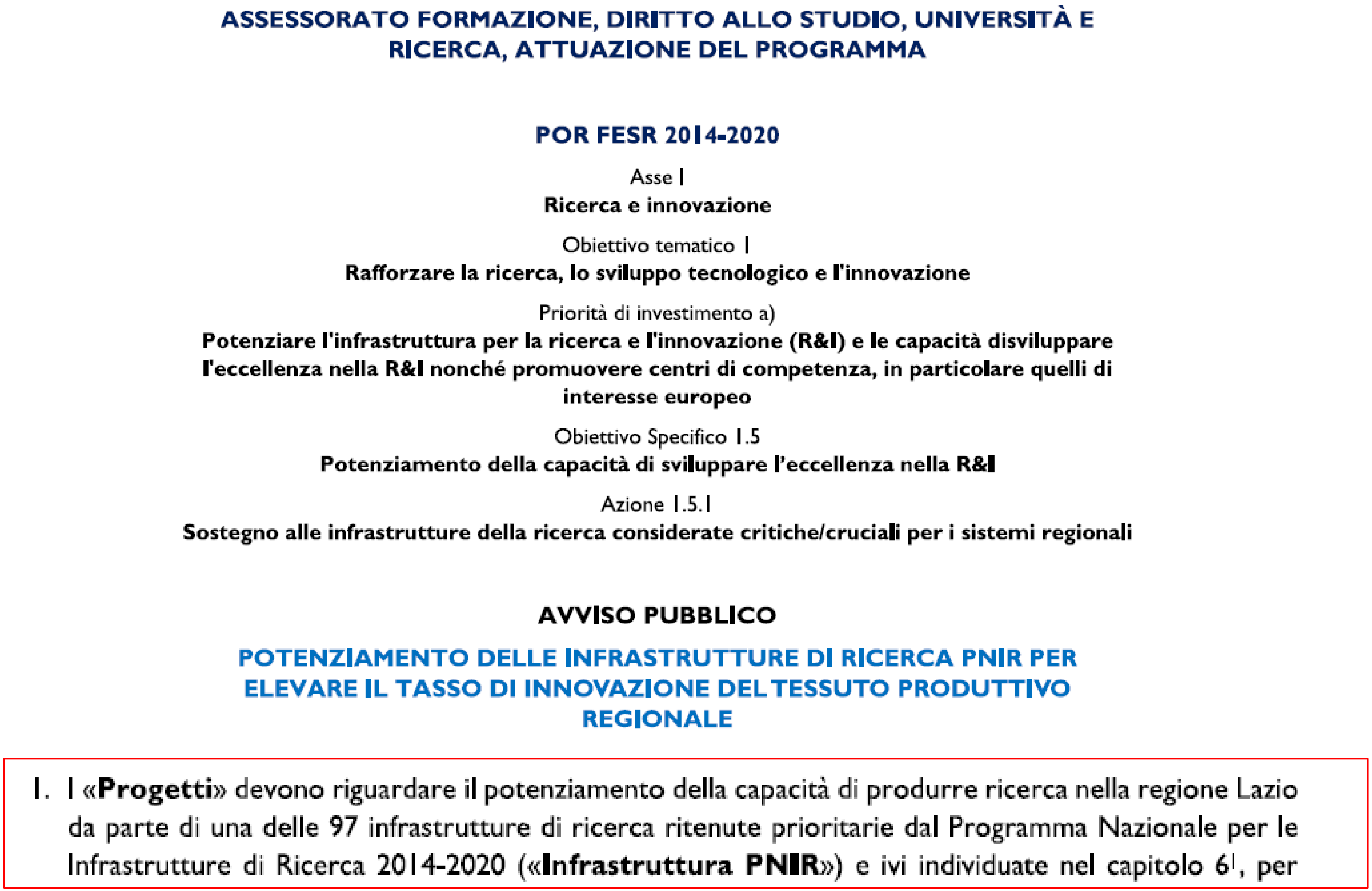
ISIS@MACH: Genesi



ASSESSORATO FORMAZIONE, DIRITTO ALLO STUDIO, UNIVERSITÀ E RICERCA, ATTUAZIONE DEL PROGRAMMA

POR FESR 2014-2020

Asse 1
Ricerca e innovazione

Obiettivo tematico 1
Rafforzare la ricerca, lo sviluppo tecnologico e l'innovazione

Priorità di investimento a)
Potenziare l'infrastruttura per la ricerca e l'innovazione (R&I) e le capacità disviluppare l'eccellenza nella R&I nonché promuovere centri di competenza, in particolare quelli di interesse europeo

Obiettivo Specifico 1.5
Potenziamento della capacità di sviluppare l'eccellenza nella R&I

Azione 1.5.1
Sostegno alle infrastrutture della ricerca considerate critiche/cruciali per i sistemi regionali

AVVISO PUBBLICO

POTENZIAMENTO DELLE INFRASTRUTTURE DI RICERCA PNIR PER ELEVARE IL TASSO DI INNOVAZIONE DEL TESSUTO PRODUTTIVO REGIONALE

1. I «**Progetti**» devono riguardare il potenziamento della capacità di produrre ricerca nella regione Lazio da parte di una delle 97 infrastrutture di ricerca ritenute prioritarie dal Programma Nazionale per le Infrastrutture di Ricerca 2014-2020 («**Infrastruttura PNIR**») e ivi individuate nel capitolo 6[1], per

ISIS@MACH

L'infrastruttura di Ricerca ISIS@MACH è un Nodo dell'Infrastrtuttura ISIS *Pulsed Neutron and Muon Source* (UK) – Un'alleanza tra l'Università degli studi di Roma "Tor Vergata", il Centro Fermi e la Infrastruttura il *Science and Technology Facilities Council* (STFC) inglese, costruita sulla eccellenza scientifica e tecnologica per l'innovazione.

Le attività di tale nodo saranno principalmente focalizzate sullo sviluppo dei **Materiali Compositi**.

ISIS@MACH: struttura

Neutroni

Caratterizzazioni funzionali

School of Mathematical, Physical & Natural Sciences
School of Engineering
University General Hospital
School of Medicine & Surgery
Università di Roma Tor Vergata
School of Law
School of Economics
School of Humanities, Arts & Social Sciences
UNIVERSITÀ DEGLI STUDI DI ROMA TOR VERGATA

ISIS@MACH

CENTRO FERMI
Museo Storico della Fisica e
Centro Studi e Ricerche Enrico Fermi

Budget progetto

Il progetto finanzia principalmente strumentazione. No personale

75% finanziamento regionale + 25% cofinanziamento

Con determinazione della Giunta Regionale n. 010795 del 07/08/2019 pubblicata sul BURL n. 69 del 27/08/2019, il Progetto è stato ammesso dalla Regione al finanziamento.
totale costo progetto euro 4.837.602,85
contributo Regionale euro 3.628.202,15 (75% del costo totale di progetto)

Contributo Regionale a Tor Vergata 2.985.866,97 (quota del 82,3%)
Contributo Regionale a Centro Fermi 642.335,18 (quota del 17,7%)

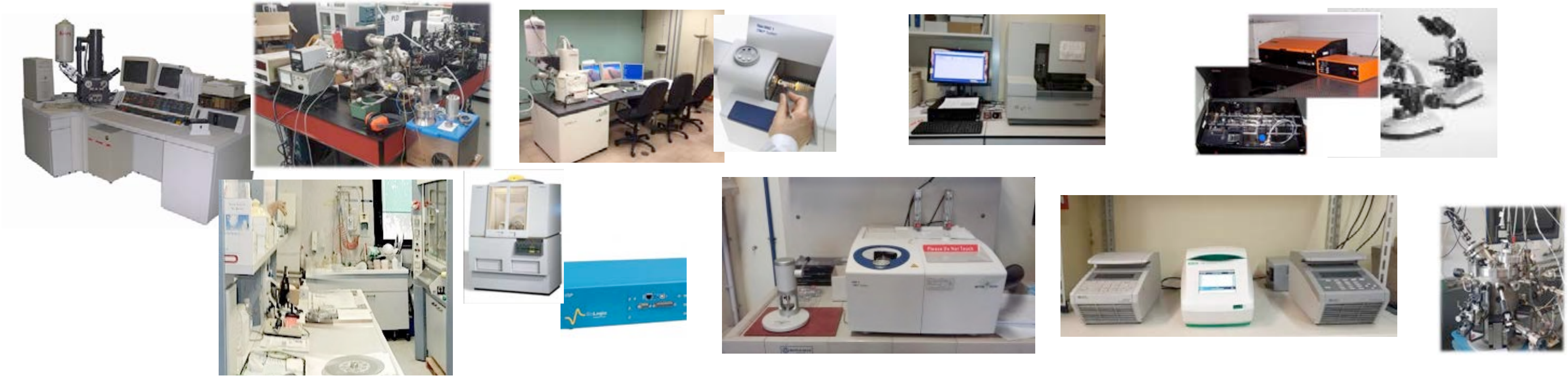
Cofinanziamento Dipartimenti e Centri di Tor Vergata aderenti = 995.288,99 euro

Strumentazione cofinanziata

Scanning Electron Microscopy
Micro Raman
Elissometro
Spettrofotometro
GasCromatografo
XRD
Sequenziatore automatico di DNA
AFM con spettroscopia Raman
Laser Onefive Origami 10 XP
ATR-FTIR
STM
DSC – TGA
Confocale
Lab equipments
Ink/jet per organici
3D printers
…
…

Strumentazione Presente

Assieme alla strumentazione che verra' acquisita, ISIS@MACH mettera' a disposizione molta strumentazione gia' presente e il personale



valore attuale della strumentazione già disponibile è pari a **€3.213.581.**

Il Personale riconducibile ai gruppi di UTOV-Centro Fermi, che partecipa al costituendo Nodo ISIS@MACH, si compone di 74 unità di cui 60 sono ricercatori, 4 amministrativi, 7 tecnici di 4 laboratorio e 3 esperti informatici, con competenze inter e multidisciplinari che spaziano dalla Biologia, alla Chimica, alla Fisica, all'Ingegneria e alla Medicina sono alla base della proposta.

Servizi offerti da ISIS@MACH

Servizi di Caratterizzazione e gli Strumenti, che si metteranno a disposizione per accesso agli utenti pubblici e privati

- Servizi di Caratterizzazione chimica
- Servizi di Caratterizzazione biochimica
- Servizi di Caratterizzazione fisica
- Servizi di Caratterizzazione elettronica
- Servizi di preparativa di campioni e dispositivi
- NEUTRON GATE per ISIS in UK

L’insieme dei servizi di ISIS@MACH fornisce quindi una offerta completa ed unica nel suo genere, di interesse non solo nell’area laziale ma anche a livello nazionale ed internazionale

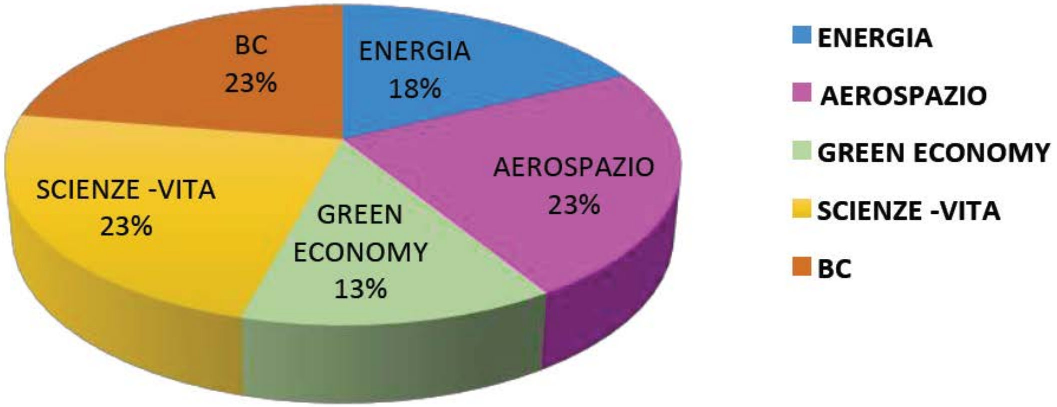
Attività di ricerca previste

Lo studio dei materiali compositi verrà principalmente coniugato nelle Aree di Smart Specialization regionale

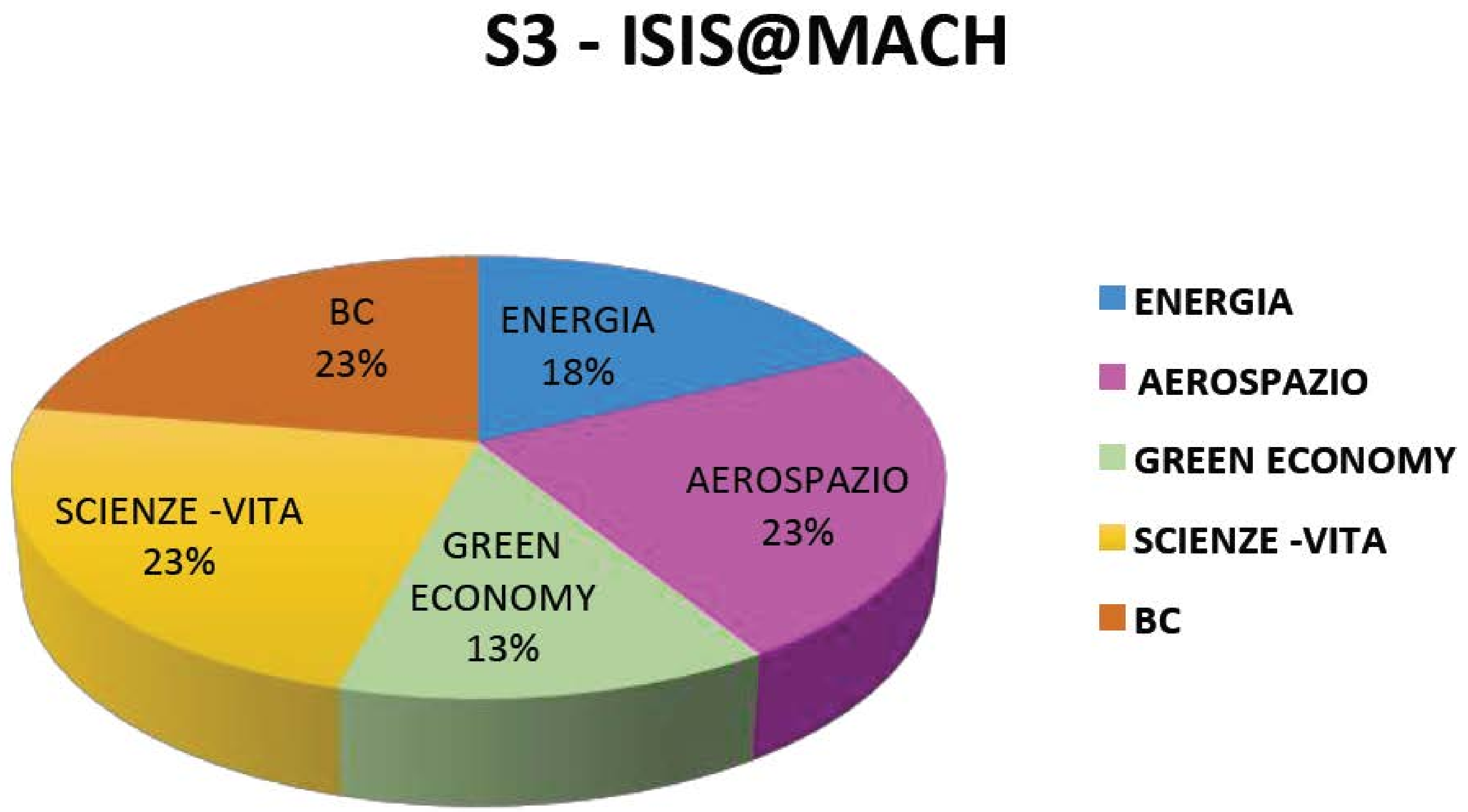
- Aerospazio,
- Scienze della Vita,
- Beni e Attività Culturali,
- Energia e Ambiente (*Green Economy*),
- ICT- Industrie Creative Digitali.

e dei Distretti del Lazio,

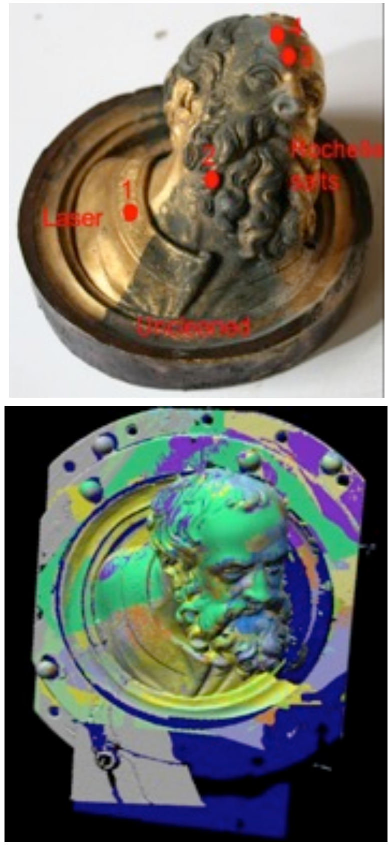
- Distretto Tecnologico Aerospaziale (DTA),
- Distretto Tecnologico delle Bioscienze del Lazio (DTB)
- Distretto Tecnologico per i Beni e le Attività Culturali (DTC)



Previsioni di attivita'



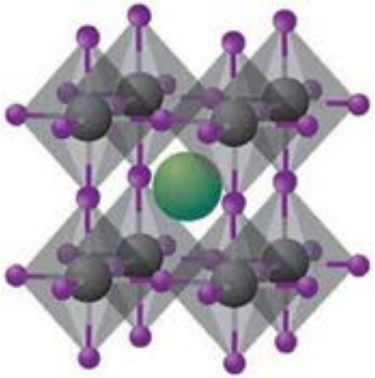
Esempi di attività già in avviate

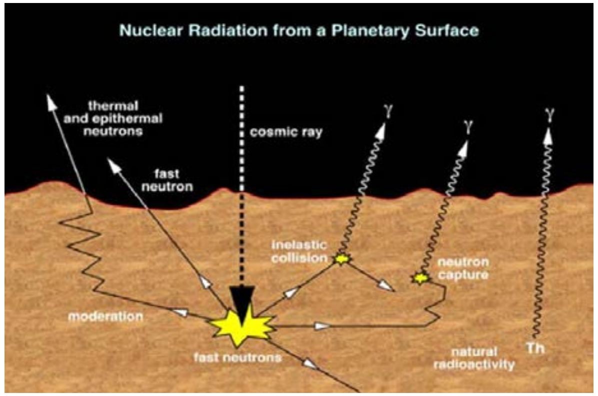

4
3
2
1
Laser
Rochelle salts
Uncleaned

Analisi 2D e 3D di due testine in bronzo dorato di Lorenzo Ghiberti provenienti dalla "Porte del Paradiso".

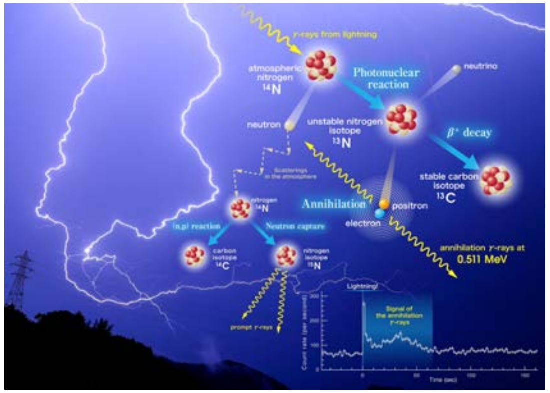
Identificazione e caratterizzazione dei biodeteriogeni procarioti di beni librari pergamenacei

Materiali ibridi organici-inorganici basate su perovskiti alogenate per applicazioni fotovoltaiche



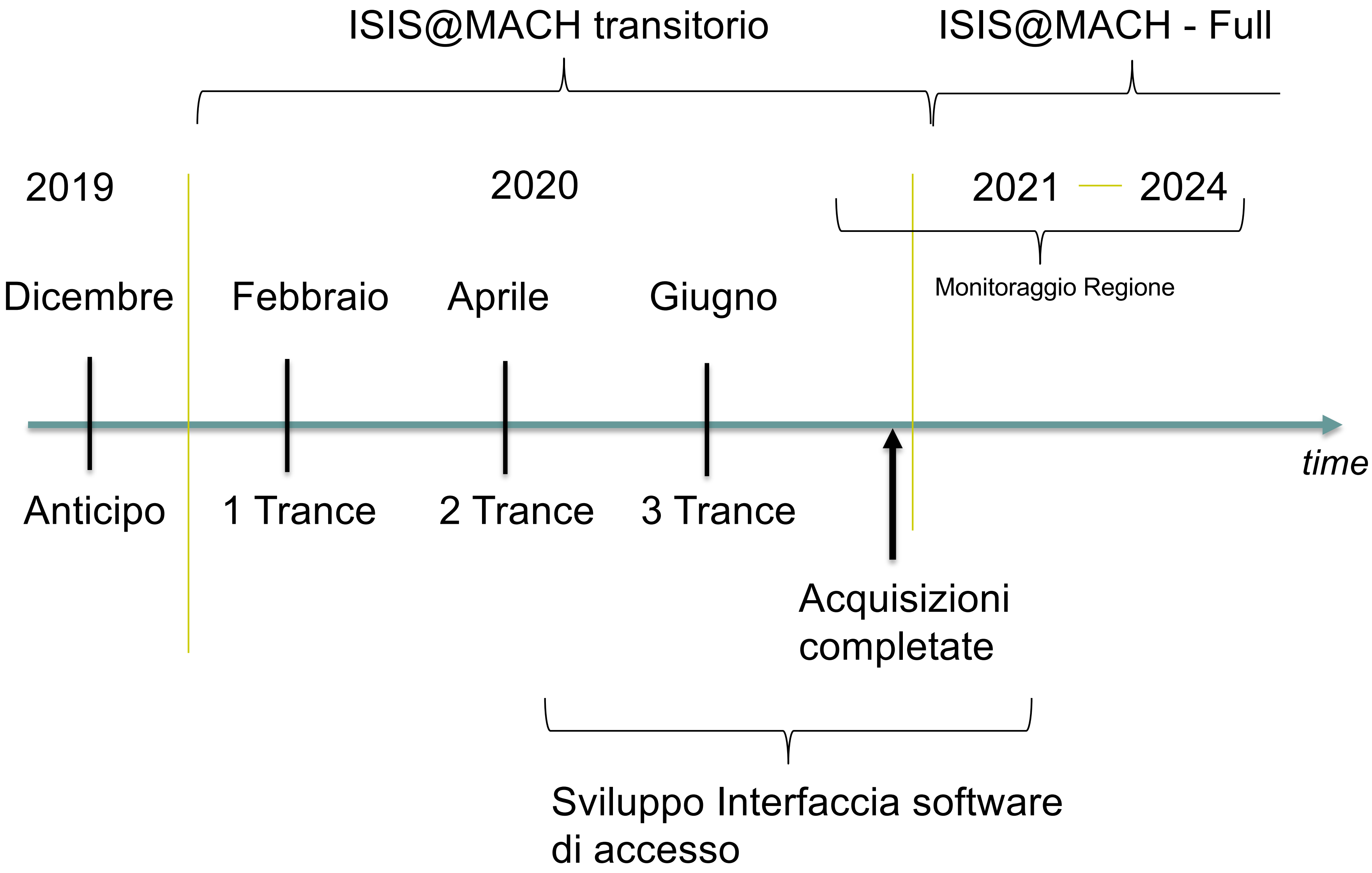

Nuclear Radiation from a Planetary Surface
thermal and epithermal neutrons
fast neutron
cosmic ray
γ
γ
γ
inelastic collision
neutron capture
moderation
fast neutrons
natural radioactivity
Th

Test di memorie flash per applicazioni spaziali con neutroni veloci


γ-rays from lightning
atmospheric nitrogen ¹⁴N
Photonuclear reaction
neutrino
neutron
unstable nitrogen isotope ¹³N
β⁺ decay
Scatterings in the atmosphere
stable carbon isotope ¹³C
nitrogen ¹⁴N
Annihilation
positron
electron
(n,p) reaction
Neutron capture
carbon isotope ¹⁴C
nitrogen isotope ¹⁵N
annihilation γ-rays at 0.511 MeV
prompt γ-rays
Lightning!
Signal of the annihilation γ-rays
Count rate (per second)
Time (sec)

Resistenza di componenti elettronici per droni a danni da radiazione neutronica

Road Map



ISIS@MACH transitorio

ISIS@MACH - Full

2019

2020

2021 — 2024

Monitoraggio Regione

Dicembre

Febbraio

Aprile

Giugno

time

Anticipo

1 Trance

2 Trance

3 Trance

Acquisizioni completate

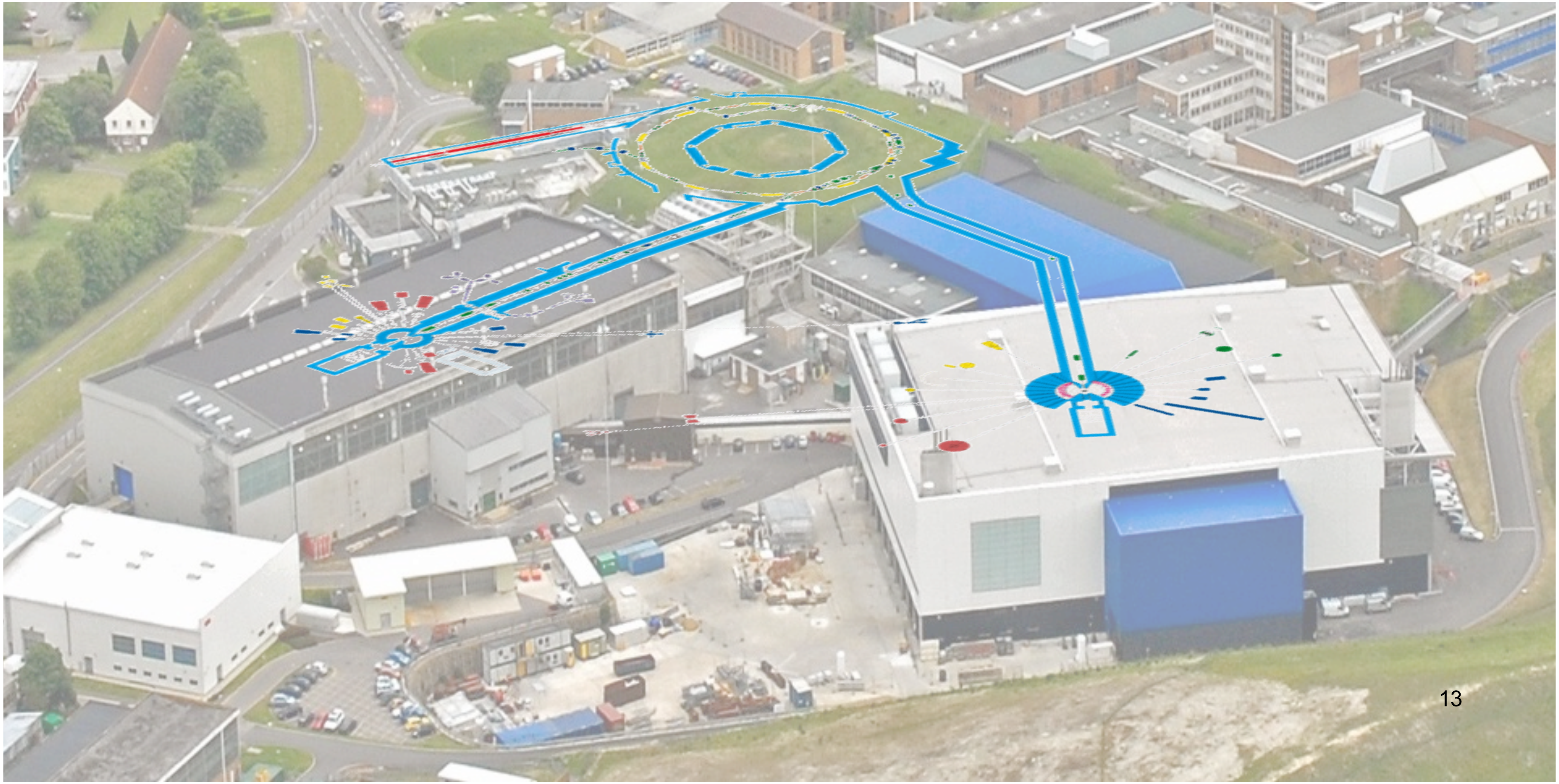
Sviluppo Interfaccia software di accesso

ISIS@MACH- ISIS: the Access Procedure and Organization Matters

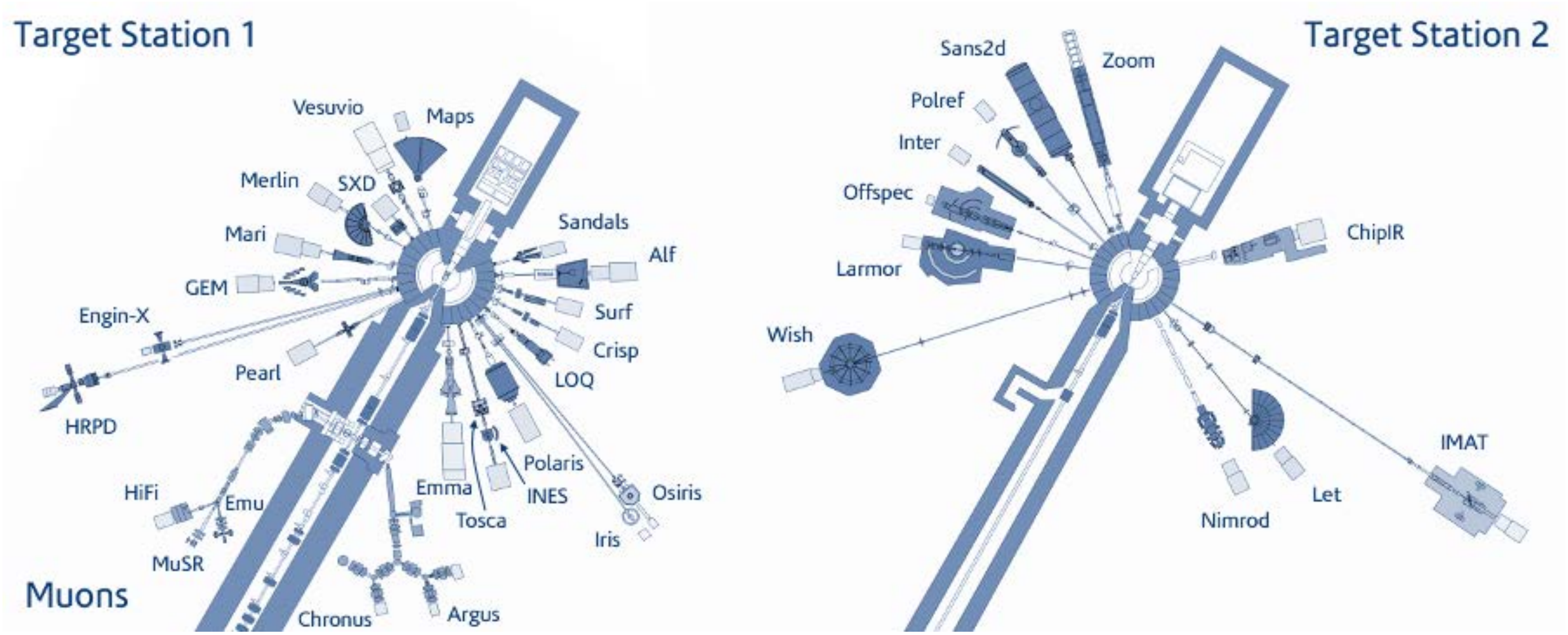
ISIS@MACH
CENTRO FERMI
ISIS (UK)

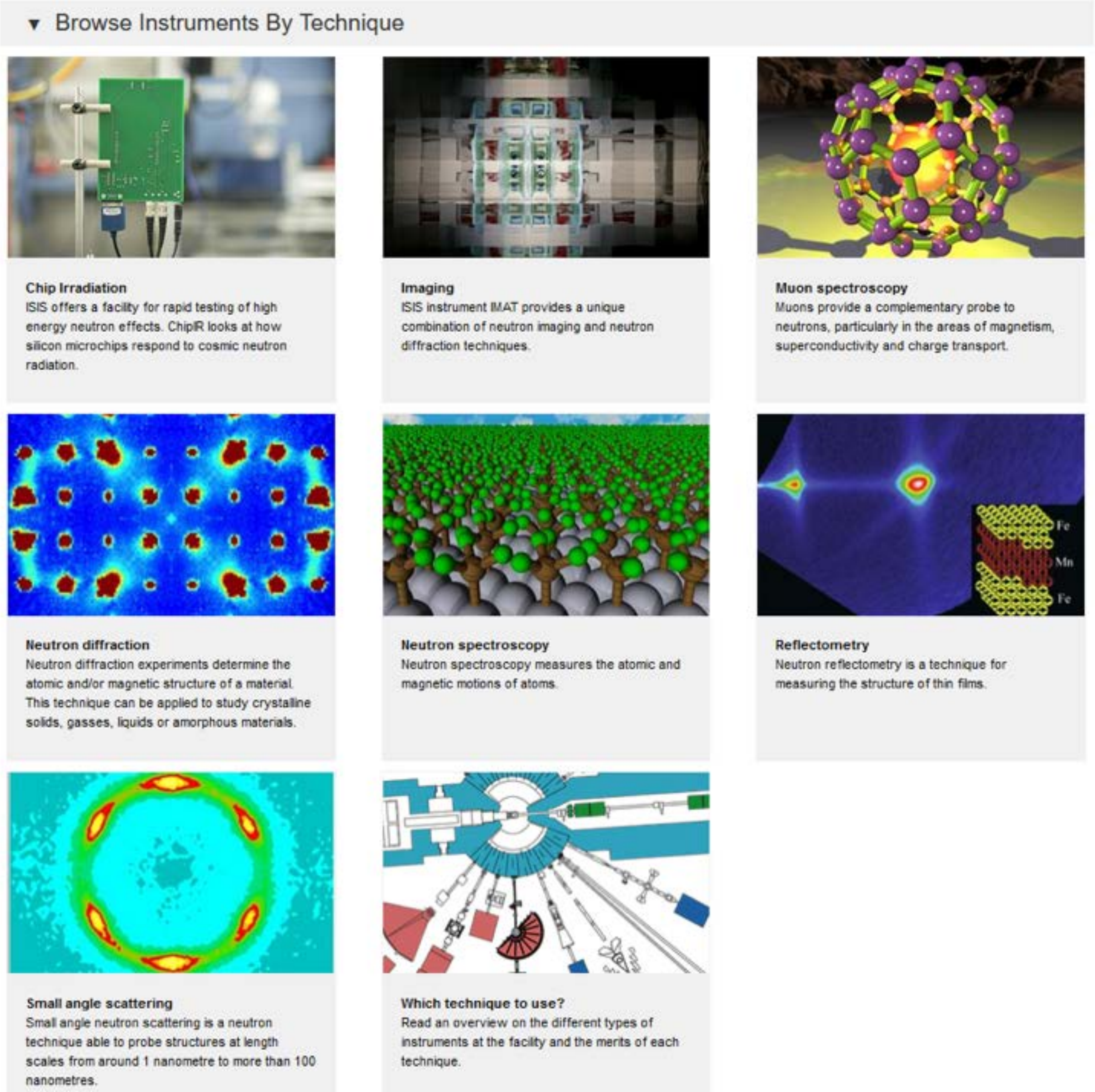
ISIS@MACH

ISIS



ISIS Neutron and Muon Source currently has over 30 neutron and muon instruments


Target Station 1
Vesuvio
Maps
Merlin
SXD
Mari
Sandals
Alf
GEM
Engin-X
Surf
Crisp
Pearl
LOQ
HRPD
Polaris
INES
Emma
Tosca
HiFi
Emu
Osiris
Iris
MuSR
Muons
Chronus
Argus
Target Station 2
Sans2d
Zoom
Polref
Inter
Offspec
ChipIR
Larmor
Wish
IMAT
Let
Nimrod



▼ Browse Instruments By Technique

Chip Irradiation
ISIS offers a facility for rapid testing of high energy neutron effects. ChipIR looks at how silicon microchips respond to cosmic neutron radiation.

Imaging
ISIS instrument IMAT provides a unique combination of neutron imaging and neutron diffraction techniques.

Muon spectroscopy
Muons provide a complementary probe to neutrons, particularly in the areas of magnetism, superconductivity and charge transport.

Neutron diffraction
Neutron diffraction experiments determine the atomic and/or magnetic structure of a material. This technique can be applied to study crystalline solids, gasses, liquids or amorphous materials.

Neutron spectroscopy
Neutron spectroscopy measures the atomic and magnetic motions of atoms.

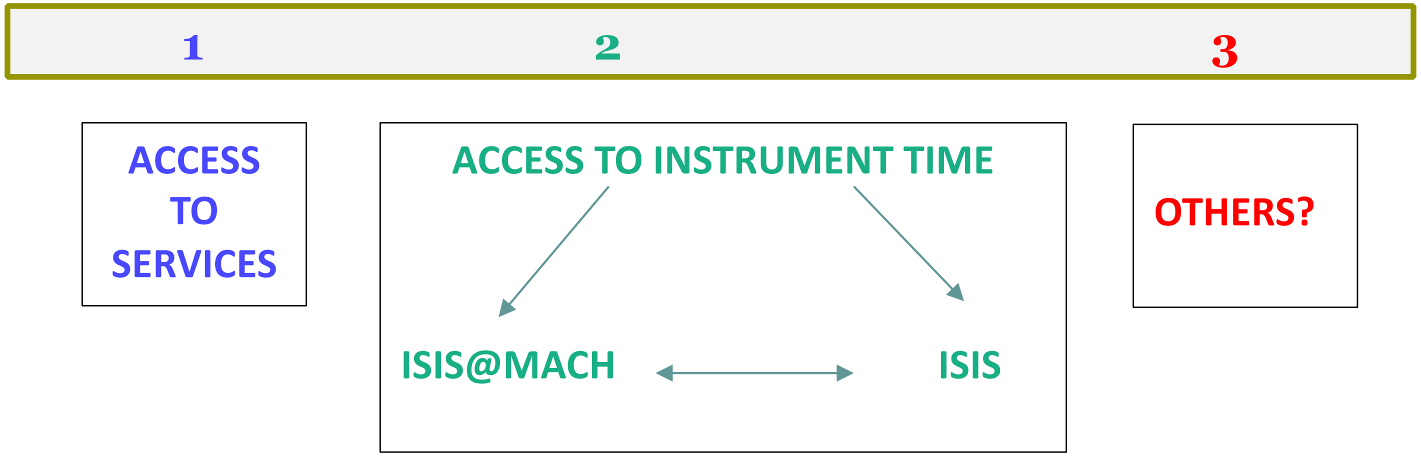
Reflectometry
Neutron reflectometry is a technique for measuring the structure of thin films.

Small angle scattering
Small angle neutron scattering is a neutron technique able to probe structures at length scales from around 1 nanometre to more than 100 nanometres.

Which technique to use?
Read an overview on the different types of instruments at the facility and the merits of each technique.

ACCESS

ACCESS TO ISIS@MACH



1

2

3

ACCESS TO SERVICES

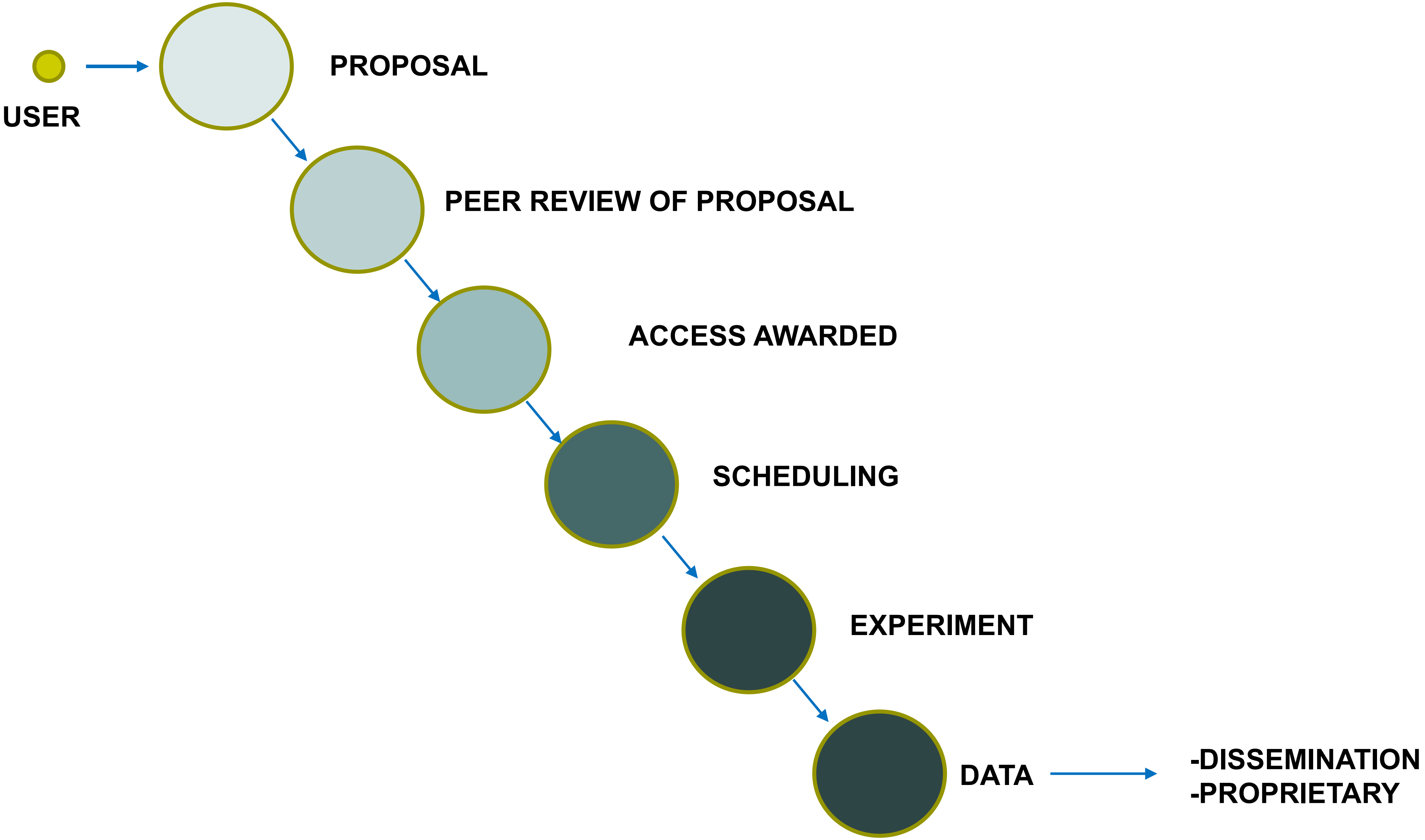
ACCESS TO INSTRUMENT TIME

ISIS@MACH

ISIS

OTHERS?

LIFE CYCLE OF ACCESS



USER

PROPOSAL

PEER REVIEW OF PROPOSAL

ACCESS AWARDED

SCHEDULING

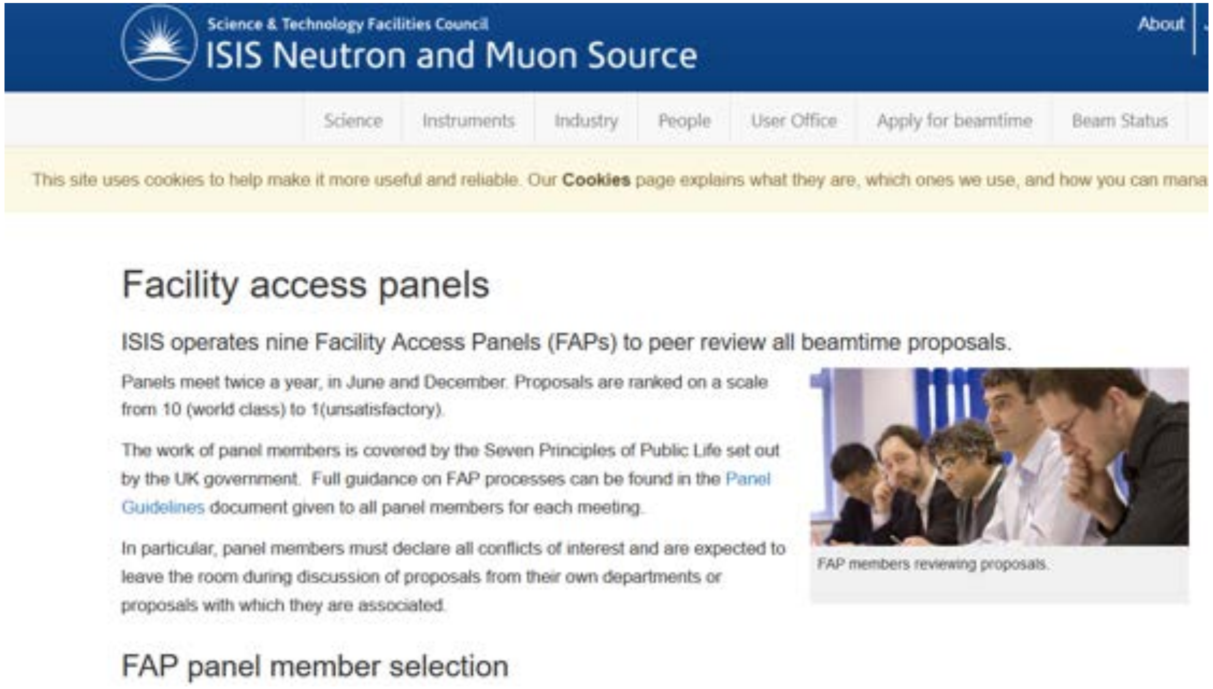
EXPERIMENT

DATA

-DISSEMINATION
-PROPRIETARY

ISIS@MACH ACCESS PANELS

To recommend to the ISIS@MACH Management a balanced science programme based upon the criteria of scientific excellence and timeliness (all within the bounds of technical feasibility and safety implications) and, where appropriate, the potential economic impact and contribution to knowledge exchange and transfer


Science & Technology Facilities Council
ISIS Neutron and Muon Source
About
Science
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Apply for beamtime
Beam Status

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Facility access panels

ISIS operates nine Facility Access Panels (FAPs) to peer review all beamtime proposals.

Panels meet twice a year, in June and December. Proposals are ranked on a scale from 10 (world class) to 1(unsatisfactory).

The work of panel members is covered by the Seven Principles of Public Life set out by the UK government. Full guidance on FAP processes can be found in the Panel Guidelines document given to all panel members for each meeting.

In particular, panel members must declare all conflicts of interest and are expected to leave the room during discussion of proposals from their own departments or proposals with which they are associated.

FAP members reviewing proposals.

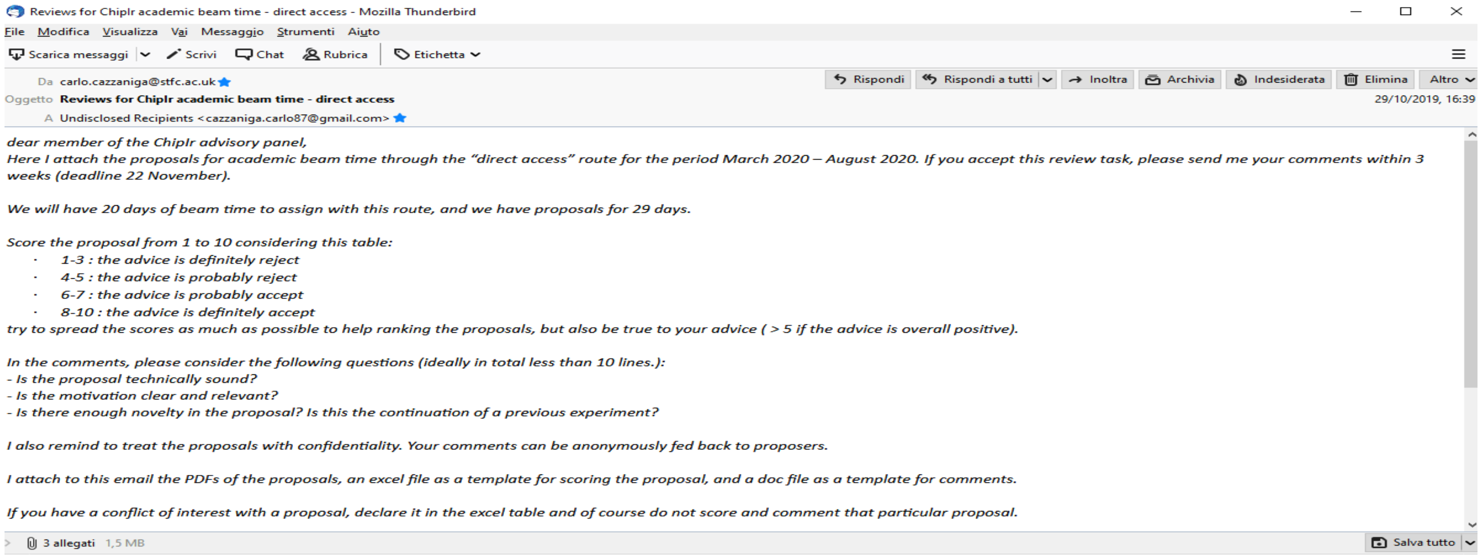
FAP panel member selection

EXAMPLE: ISIS

IMPLEMENTATION: 1) Remotely;2) PANEL PLATFORM; 3) PHYISICAL MEETING

EXAMPLES

1) Remotely


Reviews for Chiplr academic beam time - direct access - Mozilla Thunderbird
File Modifica Visualizza Vai Messaggio Strumenti Aiuto
Scarica messaggi
Scrivi
Chat
Rubrica
Etichetta
Rispondi
Rispondi a tutti
Inoltra
Archivia
Indesiderata
Elimina
Altro
Salva tutto

Da carlo.cazzaniga@stfc.ac.uk

Oggetto **Reviews for Chiplr academic beam time - direct access**

A Undisclosed Recipients <cazzaniga.carlo87@gmail.com>

29/10/2019, 16:39

dear member of the Chiplr advisory panel,
Here I attach the proposals for academic beam time through the "direct access" route for the period March 2020 – August 2020. If you accept this review task, please send me your comments within 3 weeks (deadline 22 November).

We will have 20 days of beam time to assign with this route, and we have proposals for 29 days.

Score the proposal from 1 to 10 considering this table:

- *1-3 : the advice is definitely reject*
- *4-5 : the advice is probably reject*
- *6-7 : the advice is probably accept*
- *8-10 : the advice is definitely accept*

try to spread the scores as much as possible to help ranking the proposals, but also be true to your advice (> 5 if the advice is overall positive).

In the comments, please consider the following questions (ideally in total less than 10 lines.):
- Is the proposal technically sound?
- Is the motivation clear and relevant?
- Is there enough novelty in the proposal? Is this the continuation of a previous experiment?

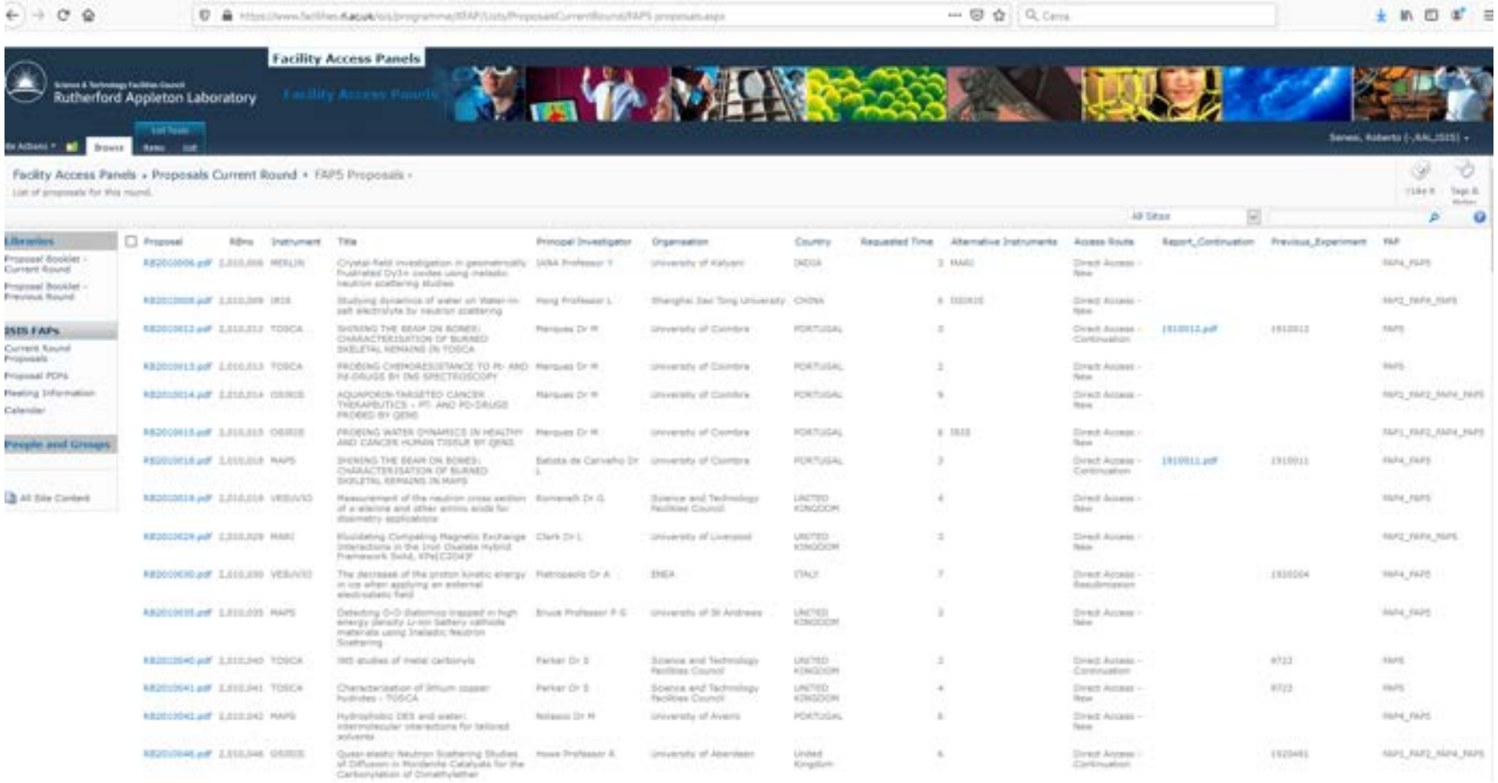
I also remind to treat the proposals with confidentiality. Your comments can be anonymously fed back to proposers.

I attach to this email the PDFs of the proposals, an excel file as a template for scoring the proposal, and a doc file as a template for comments.

If you have a conflict of interest with a proposal, declare it in the excel table and of course do not score and comment that particular proposal.

3 allegati 1,5 MB

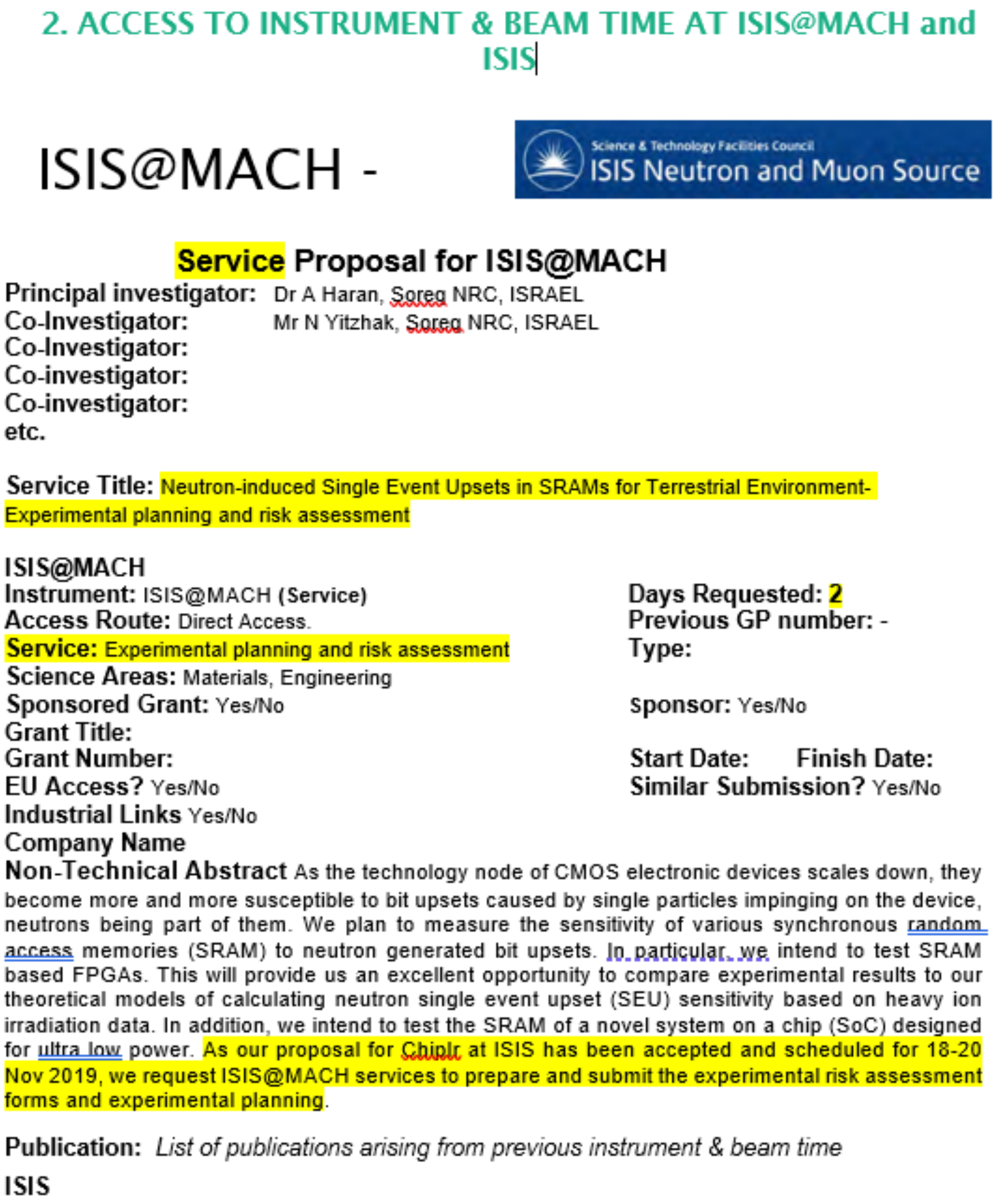
2) Platform


Facility Access Panels
Rutherford Appleton Laboratory
Facility Access Panels » Proposals Current Round » FAP5 Proposals
Libraries
ISIS FAPs
People and Groups
Proposal
Instrument
Title
Principal Investigator
Organisation

How to apply for ISIS and ISIS@MACH beamtimes

- PROPOSAL ROUNDS - biannual
- RAPID ACCESS – for urgent studies. Submit a proposal any time – rapid peer review – need a motivation
- EXPRESS ACCESS – for small amounts of beamtime (to test a sample, for a RT crystal structure, etc) – available on some beamlines – submit a proposal any time – experiment run when possible, user does not need to come
- PROJECT PROPOSAL ACCESS- for extended characterisations across instruments
- INDUSTRIAL ACCESS – through our collaborative R&D scheme (or industry can pay directly for access)

EXAMPLE OF PROPOSAL TO ACCESS ISIS@MACH SERVICES



2. ACCESS TO INSTRUMENT & BEAM TIME AT ISIS@MACH and ISIS

ISIS@MACH - Science & Technology Facilities Council ISIS Neutron and Muon Source

Service Proposal for ISIS@MACH

Principal investigator: Dr A Haran, Soreq NRC, ISRAEL
Co-Investigator: Mr N Yitzhak, Soreq NRC, ISRAEL
Co-Investigator:
Co-investigator:
Co-investigator:
etc.

Service Title: Neutron-induced Single Event Upsets in SRAMs for Terrestrial Environment- Experimental planning and risk assessment

ISIS@MACH
Instrument: ISIS@MACH **(Service)**
Access Route: Direct Access.
Service: Experimental planning and risk assessment
Science Areas: Materials, Engineering
Sponsored Grant: Yes/No
Grant Title:
Grant Number:
EU Access? Yes/No
Industrial Links Yes/No
Company Name

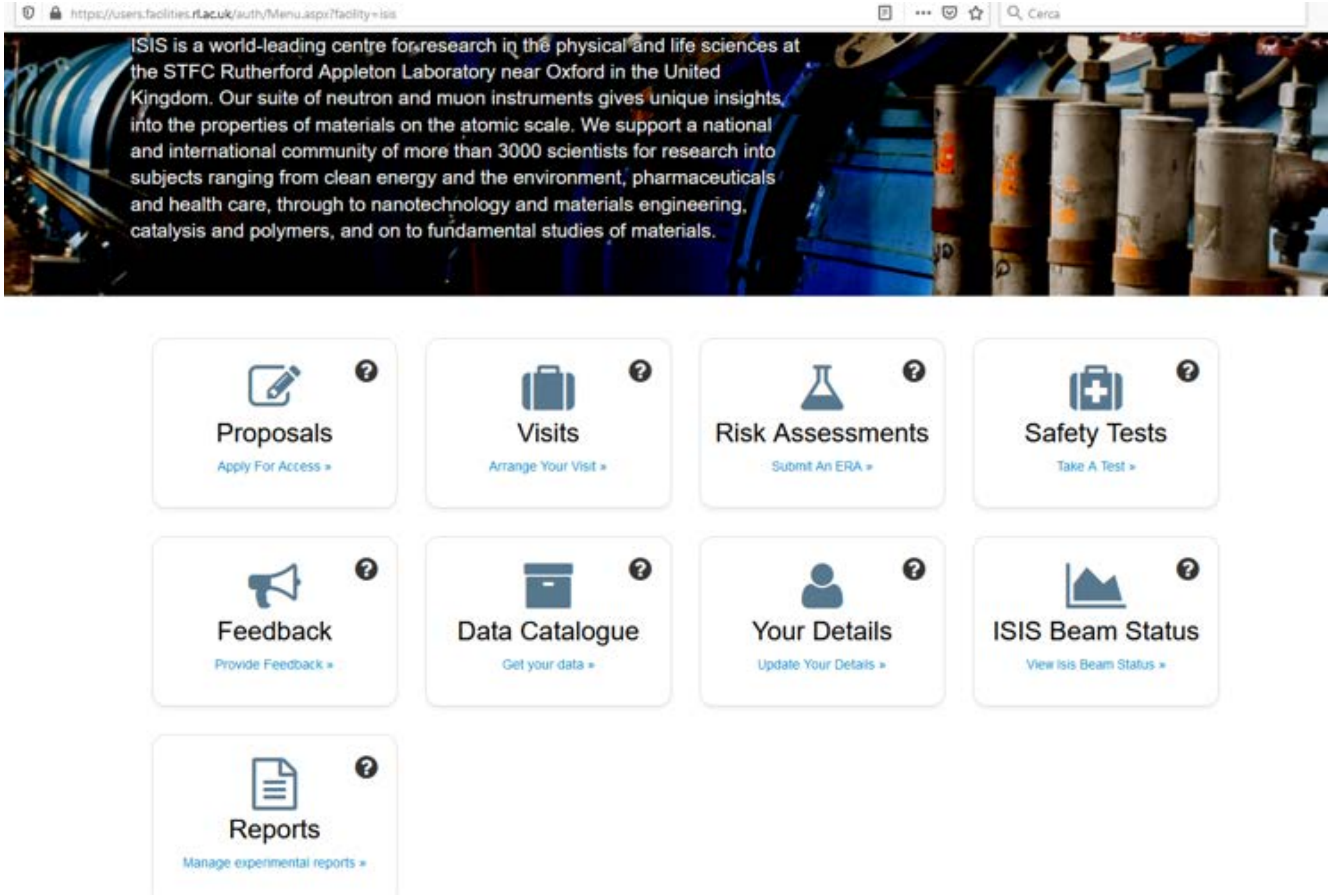
Days Requested: 2
Previous GP number: -
Type:
Sponsor: Yes/No
Start Date: **Finish Date:**
Similar Submission? Yes/No

Non-Technical Abstract As the technology node of CMOS electronic devices scales down, they become more and more susceptible to bit upsets caused by single particles impinging on the device, neutrons being part of them. We plan to measure the sensitivity of various synchronous random access memories (SRAM) to neutron generated bit upsets. In particular, we intend to test SRAM based FPGAs. This will provide us an excellent opportunity to compare experimental results to our theoretical models of calculating neutron single event upset (SEU) sensitivity based on heavy ion irradiation data. In addition, we intend to test the SRAM of a novel system on a chip (SoC) designed for ultra low power. As our proposal for Chiplr at ISIS has been accepted and scheduled for 18-20 Nov 2019, we request ISIS@MACH services to prepare and submit the experimental risk assessment forms and experimental planning.

Publication: *List of publications arising from previous instrument & beam time*

ISIS

USER PORTAL- EXAMPLE FOR IMPLEMENTATION


https://users.facilities.rl.ac.uk/auth/Menu.aspx?facility=isis
Cerca

ISIS is a world-leading centre for research in the physical and life sciences at the STFC Rutherford Appleton Laboratory near Oxford in the United Kingdom. Our suite of neutron and muon instruments gives unique insights into the properties of materials on the atomic scale. We support a national and international community of more than 3000 scientists for research into subjects ranging from clean energy and the environment, pharmaceuticals and health care, through to nanotechnology and materials engineering, catalysis and polymers, and on to fundamental studies of materials.

Proposals
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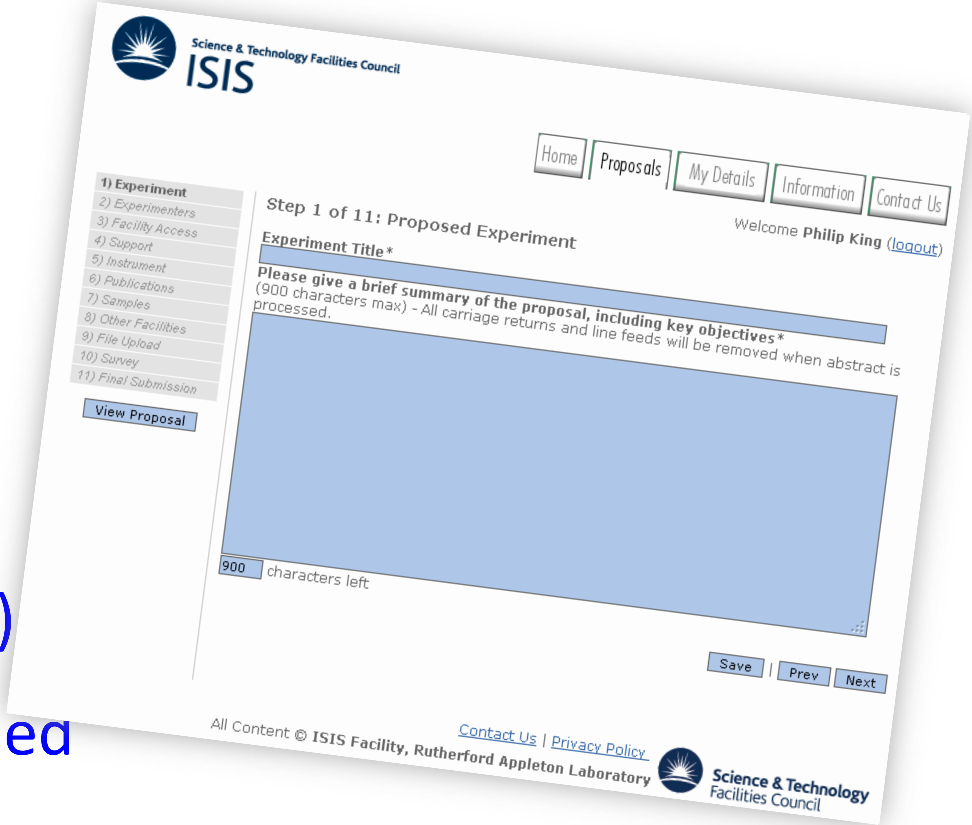
Submit An ERA »
Safety Tests
Take A Test »
Feedback
Provide Feedback »
Data Catalogue
Get your data »
Your Details
Update Your Details »
ISIS Beam Status
View Isis Beam Status »
Reports
Manage experimental reports »

How to apply for ISIS beamtime

- Two calls for proposals each year – deadlines are **16 April** and **16 October**
- Use the ISIS online proposal system (see ISIS website, ISIS@MACH work in progress)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1) Experiment
2) Experimenters
3) Facility Access
4) Support
5) Instrument
6) Publications
7) Samples
8) Other Facilities
9) File Upload
10) Survey
11) Final Submission
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Next
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Science & Technology Facilities Council

Step 1 of 11: Proposed Experiment

Welcome **Philip King** (logout)

Experiment Title*

Please give a brief summary of the proposal, including key objectives*
(900 characters max) - All carriage returns and line feeds will be removed when abstract is processed.

900 characters left

All Content © **ISIS Facility, Rutherford Appleton Laboratory**

- Requires a 2-page self-contained science case
- Proposals are peer-reviewed by science experts at the ISIS-ISIS@MACH Facility Access Panel
- Successful proposals are then scheduled

Industrial Collaborative R&D Scheme

- Started 2011; lower risk route for industry
- Provides a lower-risk way in for industry
- Industry can decide after the experiment if results should remain confidential (in which case they pay commercial rate)
- Scheme ensures ISIS and ISIS@MACH ARE informed of benefits to industrial partner

Industrial Collaborative R&D Scheme

Rolls-Royce
SIEMENS
ExxonMobil
Taking on the world's toughest energy challenges.
JM Johnson Matthey
Statoil
TWI
FMC Technologies
DSM
BRIGHT SCIENCE. BRIGHTER LIVING.
CAMERON
Unilever
First
transforming travel
bp
PETROBRAS
Infineum
BOEING
eDF
ENERGY
RSSB
ATOC
Association of Train Operating Companies
LUCCHINI
LEONARDO
ThalesAlenia Space
a Thales / Leonardo company

working with ISIS

Industrial Collaborative R&D Scheme

CONFAPI
CONFEDERAZIONE ITALIANA
PICCOLA E MEDIA INDUSTRIA PRIVATA

Airi
ASSOCIAZIONE ITALIANA PER LA RICERCA INDUSTRIALE

IPCB
ISTITUTO PER I POLIMERI COMPOSITI E BIOMATERIALI
Consiglio Nazionale delle Ricerche

MUSEO EGIZIO

U C
Química-Física Molecular

cicci research

PLUME

THALES

SOREQ
Soreq Nuclear Research Center

UNIVERSITÀ DEGLI STUDI DI MILANO
BICOCCA

T.E.E.S.

ThalesAlenia Space
a Thales / Leonardo company

LEONARDO

tiberlab

UNIVERSITÉ DE GENÈVE

IPCF
Istituto per i Processi Chimico Fisici

greatcellsolar
Global leaders in hi-tech solar

CSGI

LOT
QuantumDesign

CENTRO CONSERVAZIONE RESTAURO
LA VENARIA REALE

NEUROMED
I.R.C.C.S.
ISTITUTO NEUROLOGICO MEDITERRANEO

ArterraBioscience

MiBACT
Ministero per i beni e le attività culturali e per il turismo

Tarisio
FINE INSTRUMENTS & BOWS

working with ISIS@MACH

How to apply for ISIS@MACH and ISIS and beamtime

- Talk to ISIS@MACH and ISIS scientists before submitting a proposal
- All experiments are assigned a ‘local contact’ – in-house ISIS@MACH and ISIS scientist who is expert on the instrument
- You don’t need to have been using light probes or neutrons or muons before to use ISISMACH and ISIS!

ISIS@MACH User Office helps with practicalities of visits such as accommodation.