



RL 3 2018 Highlights

Nuclear Physics from the Lab to improve people´s health

Research Programmes

The structure of the nuclear many-body systems and its astrophysical and cosmological implications

Commissioning and exploitation of the Laser Laboratory for Accelerator and Applications

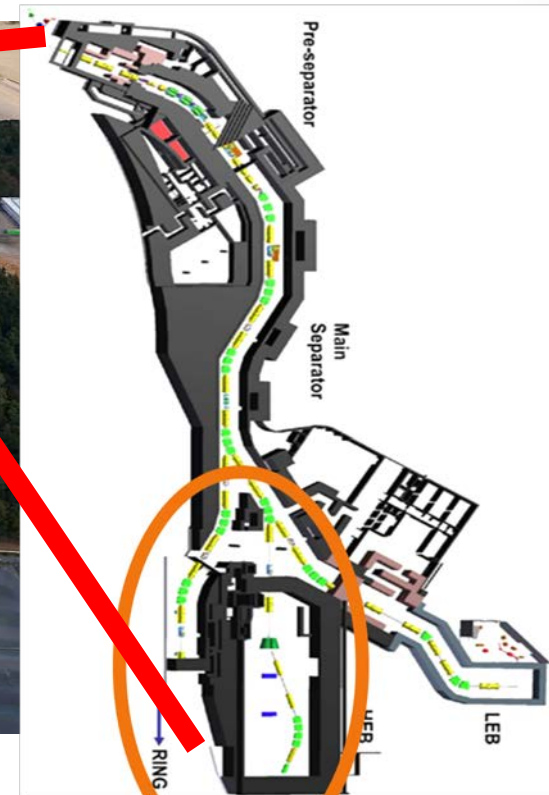
- ✓ Broad spectrum of experimental activities, **from fundamental research up to societal applications**
- ✓ At the knowledge frontier, **looking for higher precision experiments linked to the existing and in-construction worldwide radioactive ion beam facilities.**

RP 6 Structure of the many body-systems and astrophysical and cosmological applications



Common tool : Study of properties of exotic nuclei induced by heavy-ions reactions

Contribution to FAIR/R3B experiment.

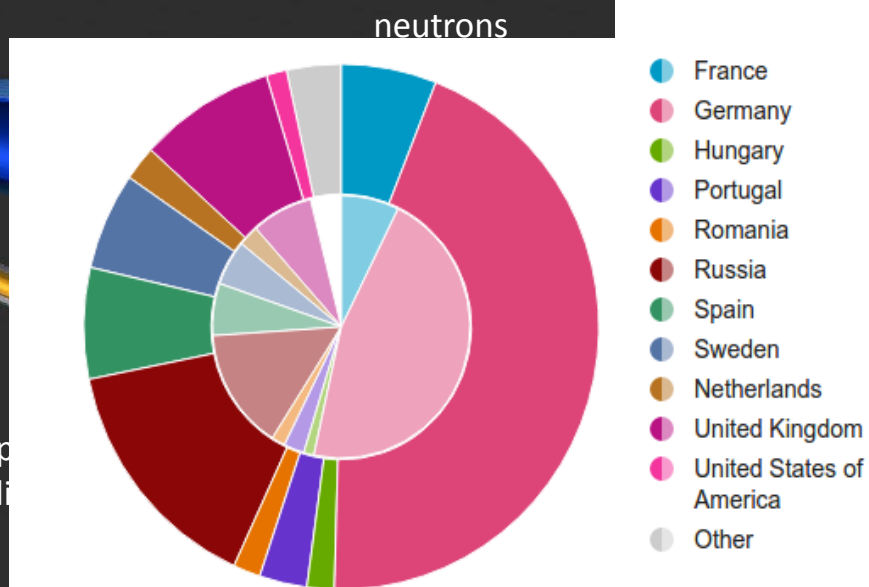
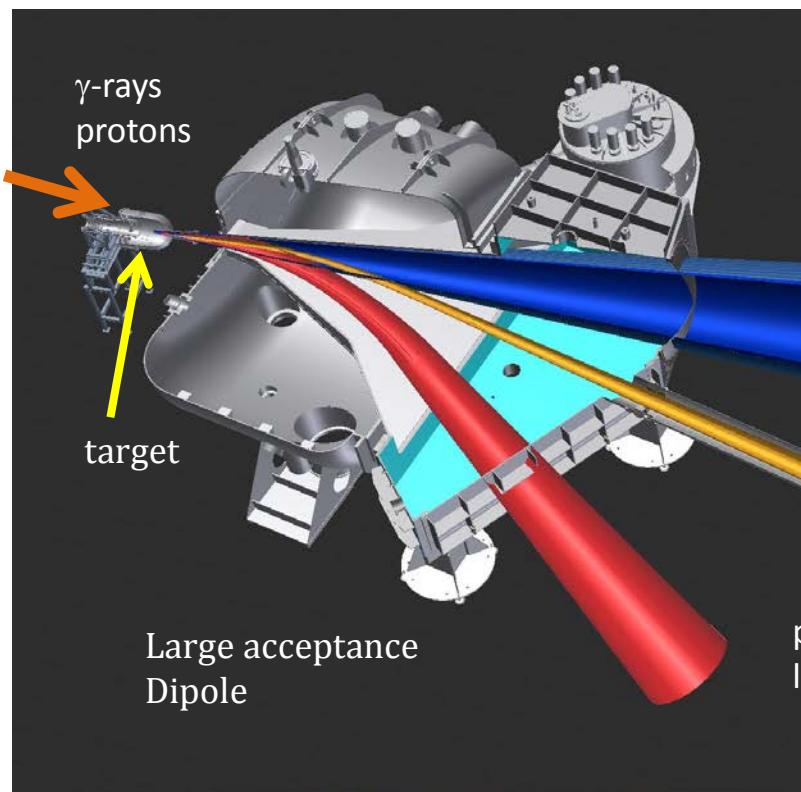


Contribution to FAIR/R3B experiment.

Complete kinematics, fixed target experiments to study reactions with relativistic radioactive beams (1 GeV per nucleon)



~ 250 scientists
~ 50 institutions
~ 15 countries

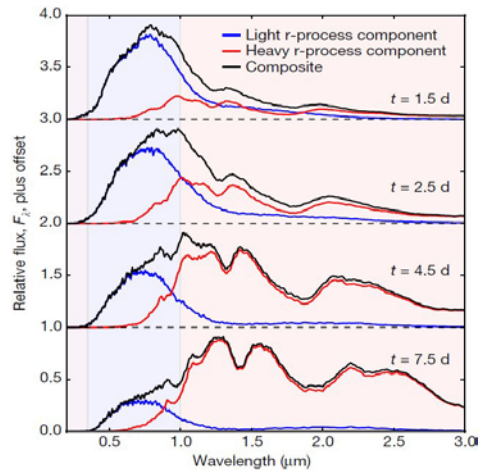
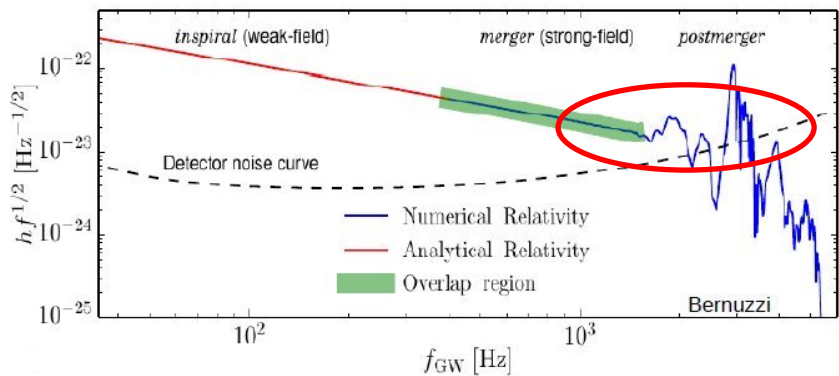


FAIR/R3B offers unique physics opportunities

- to study heavy neutron-rich nuclei of relevance to r- process of nucleosynthesis
- To reproduce "high-density environment" conditions

Contribution to FAIR/R3B experiment.

Kilonova Physics

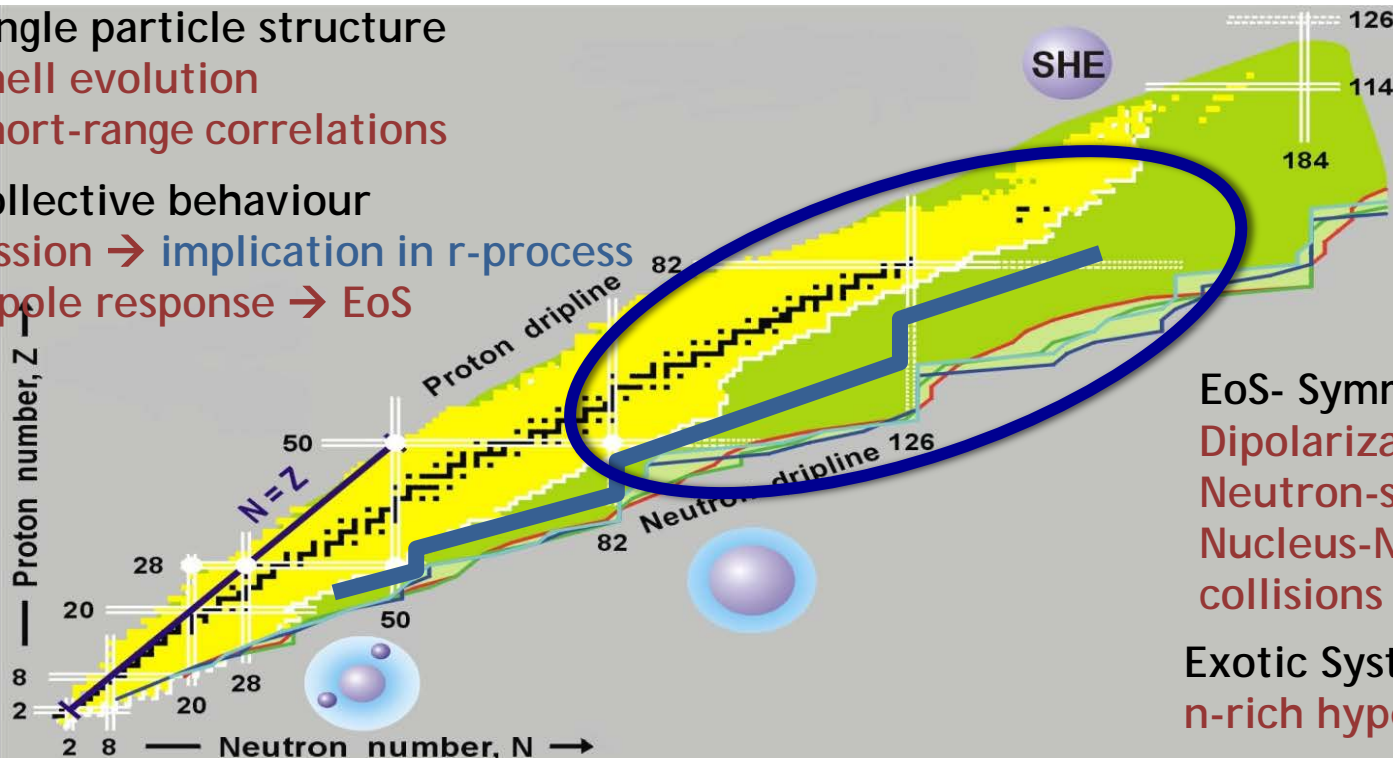


Electromagnetic signals provide first evidence for r-process nucleosynthesis.

Metzger & Martinez-Pinedo et al (2010)

Single particle structure
 Shell evolution
 Short-range correlations

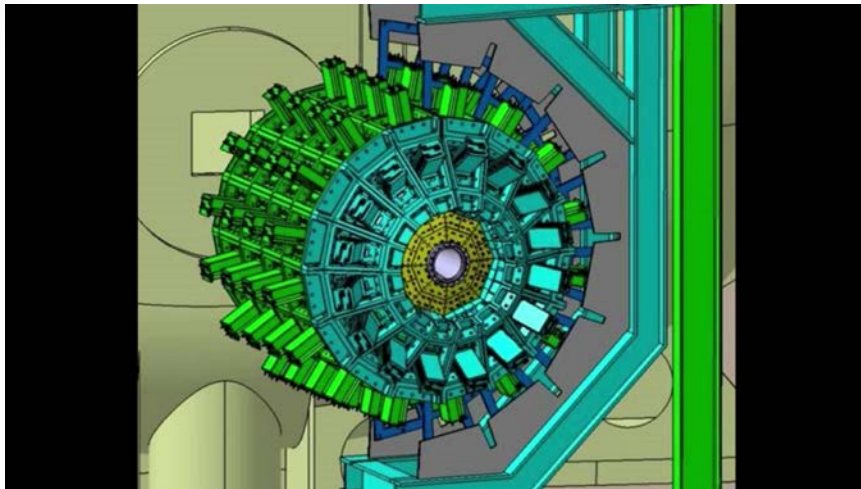
Collective behaviour
 Fission \rightarrow implication in r-process
 Dipole response \rightarrow EoS



EoS- Symmetry E
 Dipolarizability
 Neutron-skin
 Nucleus-Nucleus collisions
 Exotic Systems
 n-rich hypernuclei



CALIFA Barrel Demonstrator construction



R3B/ Phase 0 experimental program

- ✓ R3B/ CALIFA commissioning
- ✓ (p,2p) induced Fission campaign

R3B/ GSI data sorting

- ✓ On going PhD work
(Juan M. Boillos & Manuel Feijoo)
- ✓ PhD of Javier Diaz , December 2018
- ✓ EPS PhD award to J. Luis Rodríguez, September 2018

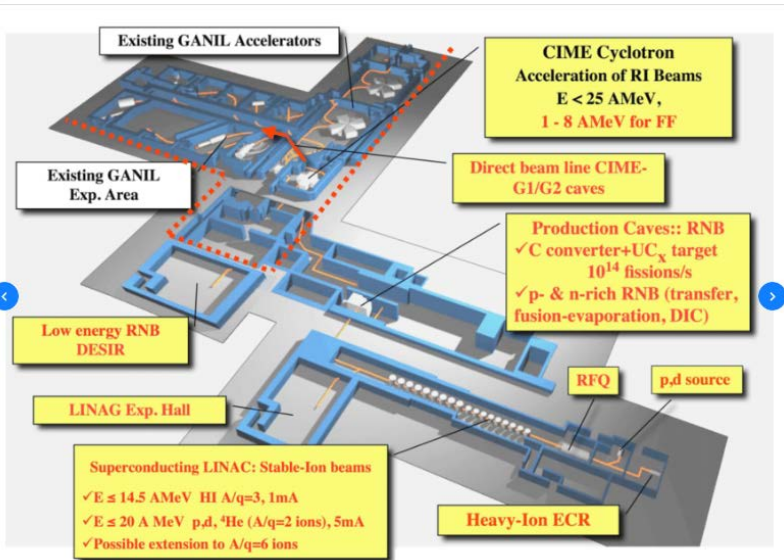
Difussion : publication and conferences



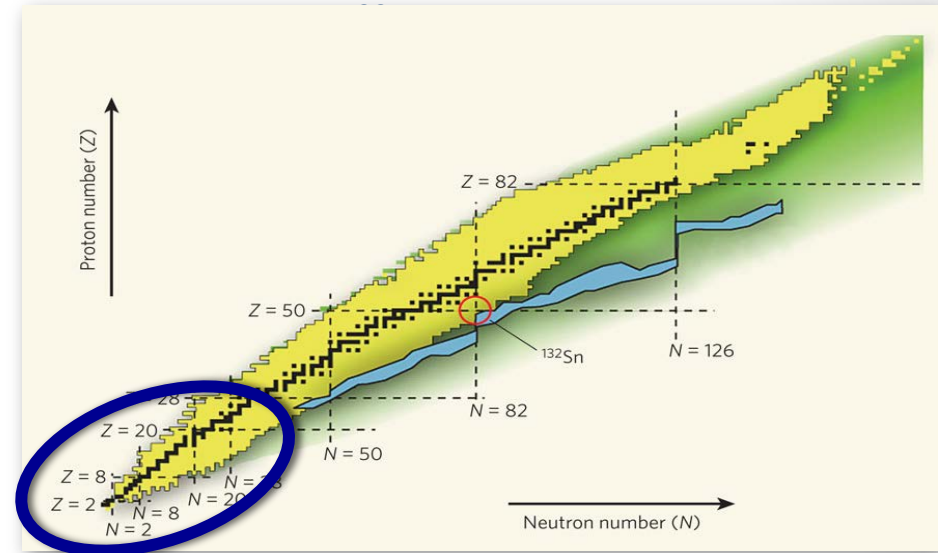
Contribution to other heavy-ion facilities



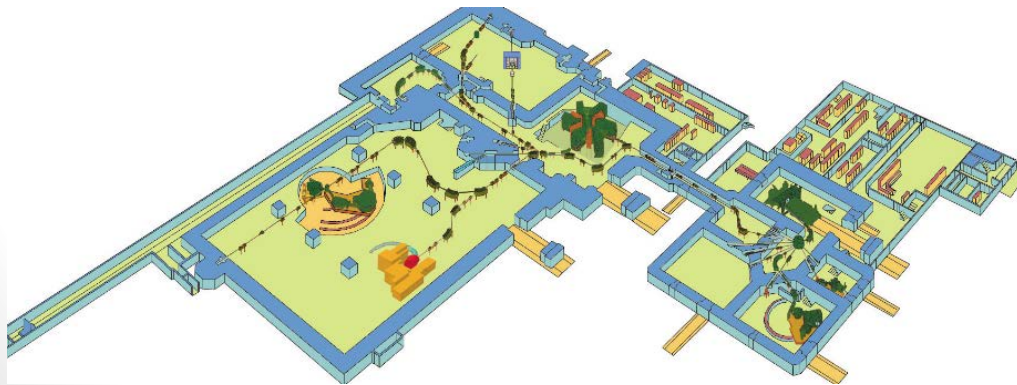
Results from GANIL-SPIRAL



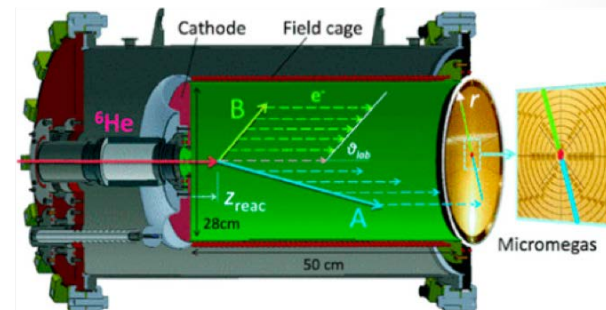
Shell evolution: Magic Numbers and Islands of Inversion



New proposal to study ${}^{16}\text{C}$ at RNCP



H.J. Ong, B. Fernández-Domínguez and D. Suzuki.,



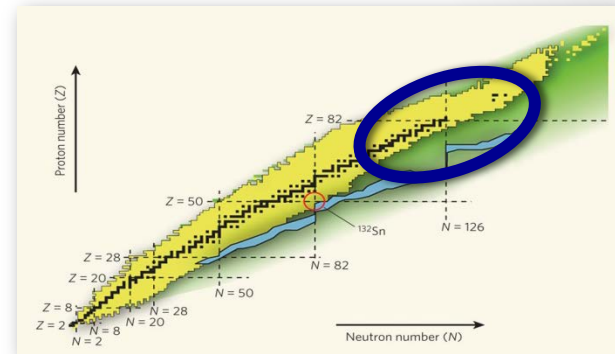
Investigation of nuclear fission in inverse kinematics @ GANIL-SPIRAL



Improvement of fission models, such as the GEF code.

D. Ramos, **M. Caamaño**, et al. Phys. Rev. C 97, 054612 (2018)

4 invited talks at international conferences and seminars.

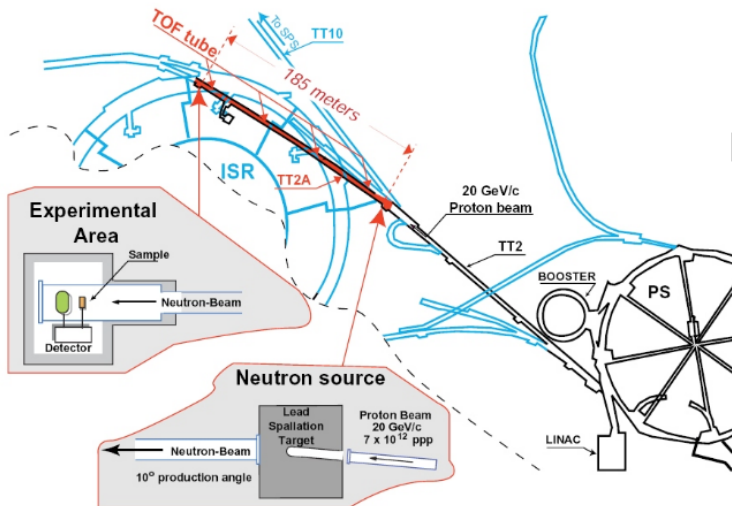


Contribution to n-TOF programme at CERN

High-accuracy nuclear data

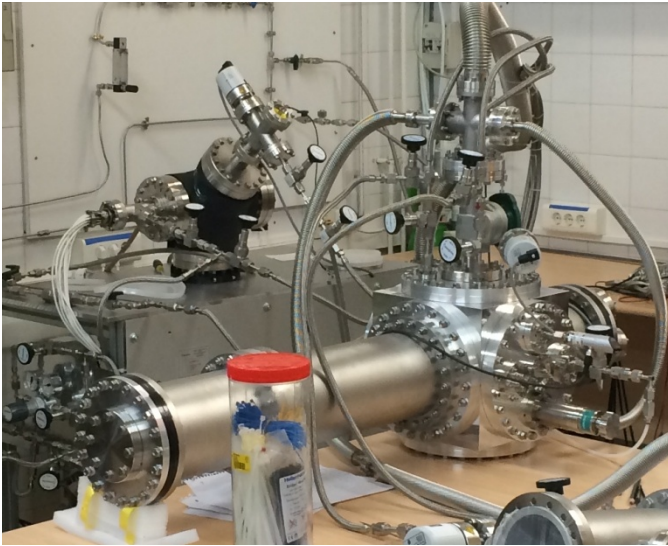
I. Durán Nuclear Data Sheets 148 Special Number pgs143 – 188 and 189 – 213

High resolution evaluation of the U5(n,f) cross section from 3 keV to 30 keV





Development of a new optical chamber for fission studies in direct kinematics (in col. with D. González, H. Álvarez, P. Cabanelas)



First Primary and amplified scintillation in 2018!

Development of instrumentation and tools for Cosmic Ray studies



TRAGALDABAS (USC)

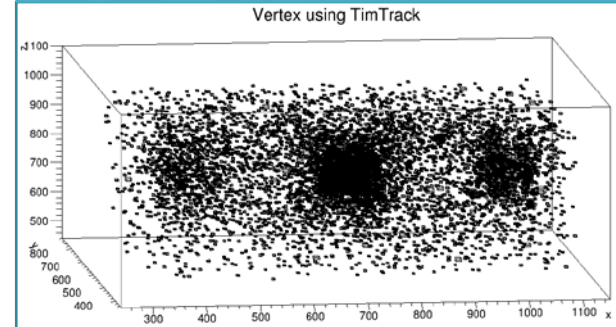
Proyecto



Solar physics, atmosphere studies,
Earth's magnetic field,
microstructure of cosmic ray
Extended Air Shower, new
signatures and others

~3 year data are being processed

MuTT (Porriño)

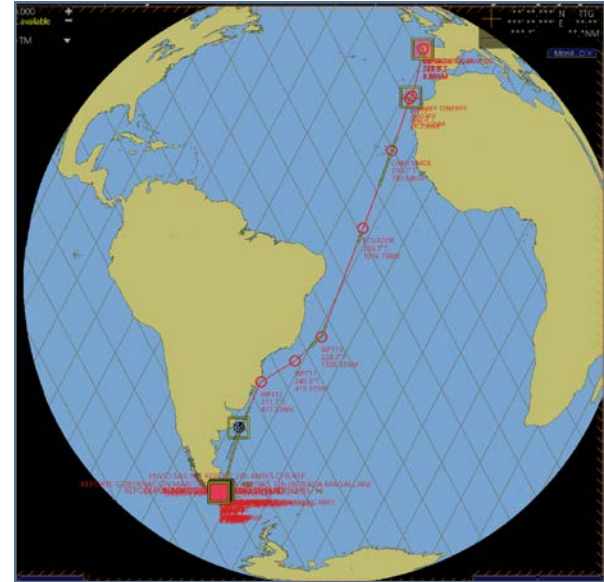


Cosmic muon tomography of
cargo containers

Ph.D: Jose Cuenca December
2018



TRISTAN (to be installed in the Spanish Antarctic Base)



Cosmic ray physics at the Spanish Antarctic Base (low magnetic rigidity threshold region)

TRISTAN has been taking data successfully in the journey between Vigo and Punta Arenas (Chile) during 26 days in Nov.-Dec. 2018