

# Becerril-Jarque, Santiago

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## UNIVERSITY DEGREE

**Master's Degree in Industrial Engineering at ETSEIB - UPC (Escola Tècnica Superior d'Enginyeria Industrial de Barcelona, Universitat Politècnica de Catalunya, Spain), 1999**

## WORK EXPERIENCE

**[2021 – nowadays] IFMIF-DONES Technical Office at UGR (University of Granada)**

### **Deputy Coordinator of Test Systems area**

- Aim: Define and coordinate the engineering tasks and strategies for all the research units related with the Test Systems area in order to reach a maturity level of the different systems consistent with the design status required for the future handover to the legal entity that will be responsible for the final stage of design, construction and exploitation of IFMIF-DONES.

### **Member of the critical Design Review Team**

- Aim: The Design Review Team will implement the critical review of all the systems of IFMIF-DONES and report to the Project Leader their current status before the handover to the legal entity.

### **Technical responsible for SC07 specific contract (EC vs private company consortium) concerning the Test Systems Ancillaries (TSA)**

### **Coordinator and technical responsible for the STUMM-PROTO and other challenging STUMM-related tasks**

Apart from the activities related to STUMM from the coordination of the Test Systems area in WPENS, I am responsible for the coordination of several activities involved in the development of the most challenging aspects of the STUMM.

The main aims of these complex collage of activities are the following:

1. To set a feasible reference design for the STUMM including a reasonable amount of detectors enough to characterise the gamma and neutron fields as well as to cross-check the theoretical models.
2. To define a good sequence and plan for the commissioning phase with beam and Li target.
3. To characterise beforehand the behaviour of the neutron/gamma detectors under a quasi-real configuration including very specific features

that may lead to additional EMC, spurious signals, cross-talk effects, thermal-induced noise background and other parasitic effects. This quasi-real configuration will include long mineral cabling (35 m) up to the first electronics capable to acquire and process the signal, similar to the configuration expected in IFMIF-DONES.

4. To explore the eventual function for some of the neutron/gamma detectors to act as a machine protection device by triggering an alarm in about 10  $\mu$ s.
5. To build some electronics packages able to properly acquire very weak signals (in the order of some pA) for monitoring and for fast machine protection alarm.
6. To explore the technical feasibility and reliability needed for a He-based pneumatic Rabbit System compatible with the long distances and constraints present in IFMIF-DONES from the STUMM (in the TC) to the final Measuring Station.

Most of the objectives listed above will be addressed by the construction and further exploitation of several prototypes: A 1:1 scale STUMM prototype (STUMM-PROTO) and an engineering, real-length prototype (40 m long) for the Rabbit System of the STUMM

***Responsible for the contract for the design and construction of the STUMM-PROTO***

- o ***Aim:*** Design, construction and FAT of the STUMM-PROTO. The STUMM-PROTO will include tens of neutron and gamma radiation instruments and will be submitted to an experimental programme base on irradiation campaigns in different European facilities.

***Responsible for the contract for the purchase of the 30 miniaturised micro-fission chambers and ionization chambers***

- o ***Aim:*** Supply of micro-fission chambers and ionisation chambers for STUMM-PROTO

***Responsible for the contract for the design for the signal acquisition electronics of some pulsed-mode micro-fission chambers.***

- o ***Aim:*** Design of electronics package able to detect single pulses from the pulsed-mode micro-fission chambers, the amplitude of the pulses being of the order of few nA. This package will complement the electronics included in the STUMM-PROTO contract.

***Responsible for the contract for the feasibility study and the design of a Rabbit System prototype***

- o ***Aim:*** Explore the feasibility of a Rabbit System adapted to the constraints of the IFMIF-DONES Plant. In case the system is considered feasible, the present contract will produce a design for a significant prototype to be built later on. The Rabbit System for IFMIF-DONES is intended to be composed by 8 helium-based pneumatic channels able to exposure to the neutron/gamma fields small spherical samples made of different specific, cleverly selected materials in order to characterize the radiation fields.

**Responsible for the contract for the purchase of the 5 self-powered neutron devices (SPND)**

- o Aim: Supply of 5 SPNDs for the STUMM-PROTO

**Coordinator for use of LIPAc for testing and validation of sensors and diagnostics**

- Aim: Use of LIPAc as a testing and validation facility for IFMIF-DONES. LIPAc is the linear accelerator built in Japan in the framework of the Broader Approach (BA) between European Union (EU) and Japan.

**[2008 – 2021] IAA – CSIC (Instituto de Astrofísica de Andalucía, Spain)**

**CARMENES-PLUS**

- Aim: Upgrading project to carry the CARMENES instrument's performance up to the ultra-stability range in the long term (5 – 10 years).

**GAMAICA**

- Aim: A fiber-fed spectrograph split into four channels for mapping of large areas of sky at high angular resolution in the visible wavelength range.

**MUSICA**

- Aim: Construction of a prototype of a small-scaled, ultra-stable, cryogenic cooling system based on nitrogen-gas continuous flow for further application to astrophysical instrumentation

**HIRES**

- Aim: A high-resolution, fiber-based, optical-infrared spectrograph for ELT devoted to find life signatures on exoplanets, the direct detection of the cosmic acceleration and other top science cases.

**PHP prototyping for eventual applications on astrophysical instrumentation**

- Aim: Development of a cooling device based on cryogenic PHP (Pulsating Heat Pipe) technology for self-working, low-maintenance astrophysical instrumentation

**CARMENES**

- Aim: A high-resolution, fiber-based, optical-infrared spectrograph for the Calar Alto Observatory devoted to the search of exoplanets.

**XMS**

- Aim: A multichannel, wide-field optical spectrograph

**Cryogenic Test Bench**

- Aim: Construction of a cryogenic test facility for the new Clean Lab at IAA.

**SIDE - DESI**

- Aim: Configurable multi-object fiber-based optical spectrograph for extremely large sky mappings

## [2004 – 2008] IAC (Instituto de Astrofísica de Canarias, Spain)

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### OSIRIS

- Aim: Optical wavelength imager and spectrograph for the GTC (Gran Telescopio de Canarias)
- Dates: 2006 - 2008
- My roles
  - Mechanical AIV responsible
  - Mechanical engineer for all the heavy-duty devices for instrument's handling
- Framework: Multinational consortium
- Highlights:
  - Technical commissioning at GTC by end 2008

### EMIR

- Aim: Infrared multi-object spectrograph
- Dates: 2004 - 2008
- My roles
  - AIV responsible
  - Responsible for cryogenic testing of the instrument's subsystems
  - Mechanical engineer for all the heavy-duty devices for instrument's handling
- Framework: Binational consortium (Spain, France)

## [2002 – 2004] ESRF (European Synchrotron Radiation Facility, Grenoble, France) [as Beamline Engineer for ID18, ID22 and BM16 beamlines](#) [ps. 47 - 50]

- My role: Provide refurbishment, upgrades and new customized devices to the beamline's instrumentation according to the requirements coming from scientists
- Dates: 2002 - 2004
- My projects and domains of expertise
  - Ultra-high precision for Kirkpatrick-Baez microscope positioning
    - Ultra-high accuracy mechanisms
    - Vacuum-compatible hardware in ultra-high vacuum environments
    - Structural mechanics
  - Position monitors for white and monochromatic beams
    - High-accuracy mechanisms
    - Water-based cooling systems
    - Vacuum-compatible hardware in ultra-high vacuum environments
  - Linear positioning device for a grazing angle X-rays mirror
    - Ultra-high accuracy mechanisms
    - Vacuum-compatible hardware in ultra-high vacuum environments
- Framework: In-house development projects together with the beamline's staff.
- Highlights

- o Full end-to-end implementation and responsibility of all the upgrading projects: from conceptual design up to integration and commissioning at the beamline.

## LANGUAGE SKILLS


English 

Spanish 

French 

## MAIN SOFTWARE SKILLS

### **CAD Software**

CATIA V6 / 3D Experience 

SolidWorks 


Pro/Engineer 

### **FEA Software**

ANSYS 

CosmosWorks 

### **Managerial Software**

Microsoft Project 

Visio Project 

### **Other software**

R Software 

Microsoft Office 