

Summary of 2025 activities

Arantxa Ruiz Martínez (IFIC, CSIC-UV)

TileCal/TDAQ-IFIC End of Year Meeting, 16 December 2025



UNIVERSITAT
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Physics & Trigger activities

Coordination positions:

- **LHC Higgs Working Group 4 (di-Higgs and multi-Higgs) Convener**, Nov 2024 - present
<https://twiki.cern.ch/twiki/bin/view/LHCPhysics/LHCHWGGH>
Preparation of the [LHC Higgs WG Report 5](#), focusing on physics goals and recommendations for LHC Run 4 with deadline on June 2026
- **CERN Next Generation Trigger Project Task 2.7 Leader**, 1 Mar - 1 Oct 2025
<https://nextgentriggers.web.cern.ch>
Enhance TDAQ for the HL-LHC using ML-based event selections, advanced acceleration technologies, enabling richer data collection and more sensitivity to new physics

Physics analyses:




- **$X \rightarrow SH \rightarrow bbbb$ search (Run 2)**: resolved channel unblinded! (Arantxa, Marta, Morvan, Varsha)
- **$X \rightarrow SH \rightarrow b\bar{b}\gamma\gamma$ search (Run 2 + partial Run 3 2022-2023)**: Editorial Board chair [[arXiv:2510.02857](#)]

Trigger:

- **Tau Trigger Run 3 performance paper** ongoing (Arantxa, Marta, Morvan)
- **Trigger DQ / Debug expert shifts** (class 2, Task ID N46640)

Trigger OTP in 2025

Contributions to Trigger (Class 1 and Class 2) in [2025](#):

2025			Institution by Month [Shifts]													Totals [Shifts]
Institutions 	First Name 	Last Name 	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Alloc	
Valencia																
Valencia	Francesco	Curcio	0.00	0.00	0.00	7.00	0.00	0.00	0.00	7.00	7.00	0.00	6.00	1.00	28.00	
Valencia	Marta	Lanzac Berrocal	0.00	0.00	0.00	2.00	17.00	2.00	0.00	0.00	7.00	0.00	7.00	0.00	35.00	
Valencia	Arantxa	Ruiz Martinez	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.60	5.60	0.00	0.00	11.20	
Valencia	Morvan	Vincent	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.80	3.60	0.00	0.00	8.40	
Valencia (4)		Sum:	0.00	0.00	0.00	9.00	17.00	2.00	0.00	7.00	24.40	9.20	13.00	1.00	82.60	

Supervision / PhD Thesis committees

Supervision / mentoring:

- [Varsha Senthilkumar PhD Thesis](#), 26 Sep 2025
“Search for a resonance decaying into a scalar particle and a Higgs boson in the final state with four bottom quarks in proton-proton collisions at a centre-of-mass energy of 13 TeV with the ATLAS detector”
- **Alfredo Ramírez Bachelor Thesis (Trabajo Fin de Grado, TFG)**, Sep 2025
“Estudio de la producción de pares de bosones de Higgs en el experimento ATLAS”
- Coming: **Marta Lanzac, Morvan Vincent, Ferran Ortiz** (welcome!)

PhD Thesis committees:

- [Antonio J. Gómez PhD Thesis](#), 14 Feb 2025
“Unveiling the Higgs sector with tau-leptons: differential cross-section measurements and searches for lepton-flavor-violating decays with the ATLAS detector”
- [Jesús P. Márquez PhD Thesis](#), 28 Mar 2025
“Study of electromagnetic shower events with high granularity calorimeter prototypes and search of new physics involving heavy quark final states in future lepton colliders”
- [Antonio Cervelló PhD Thesis](#), 19 Sep 2025
“Developments for the Data Acquisition and Control Systems of the ATLAS Tile Calorimeter for the HL-LHC”

Participation in courses / conferences / workshops

- [Doctorate Course: Flavor Physics in the Standard Model and Beyond](#), Prof. Guido Martinelli, 24-26 Mar 2025
Organized at IFIC by Miguel Ángel Sanchís Lozano and Arantxa Ruiz Martínez
- [ANIMMA 2025](#), Valencia, 9-13 Jun 2025
Lecturer in the ANIMMA International Summer School (AISS 2025): “High Energy Physics Instrumentation”
Participation in Women In Engineering (WIE) event
- [BSM benchmarks for next-generation triggers](#), CERN, 4 July 2025
Discussion and brainstorming about BSM scenarios that could provide interesting benchmarks to drive and evaluate the performance of trigger strategies for the HL-LHC phase, as made possible by the new tools developed within the Next Generation Triggers project (WP1, WP2 and WP3)
- [ATLAS Higgs and DiHiggs Workshop](#), Warwick, 15-19 Sep 2025
“LHCHWG Report 5 (focus on Run 4)” presentation
- [International Workshop on Future Linear Colliders \(LCWS 2025\)](#), Valencia, 20-24 Oct 2025
Higgs and Electroweak Physics convener
- [The 22nd Workshop of the LHC Higgs Working Group \(LHCHWG 2025\)](#), CERN, 3-5 Dec 2025
WG4 session organizer and “WG4 HH and multi-Higgs: Outlook and Plans” presentation

Committees / Projects

Participation in IFIC committees:

- Colloquium organizer (01/04/2024 - present)
- Comisiones de selección contratos CSIC
- Comisión de selección RyC y DEAGENT
- Comisión de selección JAE Intro ICU 2025

New projects starting in 2025:

- **PID2024-156310NB-I00** (01/09/2025 - 31/08/2028)
Upgrade of the ATLAS Tile Calorimeter and Trigger Systems, Physics Performance and Detector R&D for Future Circular Colliders
- **CIPROM/2024/69** (01/09/2025 - 31/08/2029)
Advanced Data Processing Technologies for Exploring New Physics in Future Particle Colliders



Happy Holidays!

Looking forward for an exciting & fruitful 2026!

