

Agustín Sánchez Losa

IFIC - Instituto de Física Corpuscular
Edificio Institutos de Investigación
Apartado de Correos 22085
E-46071 Valencia (Spain)

☎ +34 686 373 583

☎ +34 96 354 35 42

FAX +34 96 354 34 88

✉ agustin.sanchez@ific.uv.es | agustin.sanchez.loso@gmail.com

🌐 <http://bit.do/agustin-sanchez-loso>



Curriculum Vitæ

Current Professional Situation

position PhD Student in Astroparticle Physics with a Spanish government grant (FPI BES-2010-033616)
institute IFIC – Instituto de Física Corpuscular (Spain)
group ANTARES – KM3NeT

Education

2014 **PhD in Physics**, *University of Valencia*, co-direction between **IFIC-CPPM**.

(Thesis dissertation defence expected by Autumn 2014)

"Search for High Energy Cosmic Muon Neutrinos from Variable Gamma-Ray Sources and Time Calibration of the Optical Modules of the ANTARES Telescope"

Supervisors: J. J. Hernández-Rey (IFIC) & D. Dornic (CPPM)

2010 **MSci in Advanced Physics**, *University of Valencia*.

"Developing an Automate Procedure for the Time Calibration of the ANTARES Neutrino Telescope"

Supervisor: J. Zúñiga (UV)

2009 **BSc in Physics** (5 years degree), *University of Valencia*.

Research Fields

High Energy Experimental Physics • Astro-Particle Physics
Neutrino Telescopes • Transient Analyses • Multi-Messenger Approaches

My research interests are oriented to the astro-particle physics field in an experimental base.

During my PhD, I was the responsible in keeping, monitoring and coordinating the time calibration of the ANTARES detector. In particular I made the frequent recalibrations *in situ* of the detector time constants by means of the different optical beacons installed on it with an automatized software suite developed by me during my MSci. I also got the chance to participate in sea operations of ANTARES line recovery and study of future emplacements for KM3NeT in the French site by small autonomous lines (MEUST project).

My PhD investigation was focused on the search of cosmic neutrino sources within a multi-messenger approach where the data from ANTARES was analysed in coincidence with the X-ray, gamma-ray and high energy gamma-ray emission of the candidate transient sources for study. The later was extracted from the

analysis of the data from FERMI, SWIFT, ROSSI and MAXI and publications done by MAGIC, HESS and VERITAS and motivated by the correlation expected between the neutrino and the gamma-ray emission in an hadronic scenario. The transient information provided by the gamma-ray emission observed improves the neutrino point-source analysis in a factor 2–3 with respect to a time integrated analysis.

Stages in Laboratories

1. **CPPM** (*Centre de Physique des Particules de Marseille*), Marseilles (France) (10 months)
 The CPPM is the home institute of the ANTARES experiment. Due to its proximity to the ANTARES site most of the operations have base on it. There I took part in various sea operations and designed the analyses of my PhD under the supervision of D. Dornic, the responsible of transient and multi-messenger analyses in ANTARES. Contact people: P. Coyle / V. Bertin / D. Dornic.
 03/06/2013 – 28/10/2013 (21 weeks) | 13/01/2013 – 31/01/2013 (3 weeks)
 23/09/2012 – 27/09/2012 (1 week) | 02/03/2012 – 27/06/2012 (16 weeks)
2. **Nikhef** (*Nationaal instituut voor subatomaire fysica*), Amsterdam (Netherlands) (2.5 months)
 The Nikhef institute has play an important role in the ANTARES point-source analysis among others. There I learnt to use and designed the analysis tools I employed to my work coached by A. Heijboer and C. Bogazzi. Contact people: M. de Jong / A. Heijboer.
 04/10/2011 – 15/12/2011 (10 weeks)
3. **IFIC** (*Instituto de Física Corpuscular*), Valencia (Spain) (3–4 years)
 The IFIC institute has developed the optical beacon system of ANTARES and is in charge of its time calibration. It also performs point-source and dark matter analyses. Here is where I made my MSci and my PhD. Contact people: J.J. Hernández-Rey / J.D. Zornoza / J. Zúñiga.
 November 2009 – Present (5 years)

Schools & Workshops

1. **The Universe in light of Planck and BICEP2**: master and doctorate course about cosmology, inflation and experimental observations
 Faculty of Physics, Valencia University, Valencia (Spain), 12–16 May 2014
2. **Advanced C++ Course**: Course of the new standards in C++11 and C++14
 IFIC, Valencia (Spain), 10–16 April 2014
3. **Statistical Analysis Tools for Particle Physics**: TMVA (Toolkit for Multivariate Data Analysis) workshop within the IDPASC School of Flavour Physics
 IFIC, Valencia (Spain), 6–7 May 2013
4. **Workshop on Dark Matter tools and Hands-on Fermi analysis**: FERMI/NASA tools software workshop
 IFIC, Valencia (Spain), 22–26 April 2013
5. **ISAPP Paris 2012** (*International School on Astroparticle Physics*)
 APC, Paris (France), 2–13 July 2012
6. **SeaTray & AntDST Workshop**: ANTARES internal software workshop
 ECAP, Erlangen (Germany), 17–18 September 2011
7. **ISAPP Zaragoza 2010** (*International School on Astroparticle Physics*)
 University of Zaragoza, Zaragoza (Spain), 13–22 July 2010

Employment

- 01/09/2010 - Present | **PhD Fellowship**, IFIC (Spain)
4-year grant for the PhD realisation awarded by the Spanish Ministry of Science focused in the training of research personnel (FPI BES-2010-033616).
- 11/05/2010 - 31/08/2010 | **Pre-PhD Contract**, IFIC (Spain)
Temporary contract as superior technician in research provided by CSIC (Spanish national research council).

Computing Skills

C / C++98 / C++11 • Python • Perl • Bash / Shell Scripting
ROOT • Mathematica • SQL • HTML / HTML5 / CSS • T_EX / L^AT_EX

I have used all those languages extensively for my work. Additionally I have learnt and used the **Fermi Science Tools** software, conceived for the processing of the Fermi satellite data, and also familiarized with the astronomic digital file format **FITS** and its analysing with the SAOImage DS9 software. For the ANTARES data analysis I used the **Antares-DAQ** software package and been introduced to the **SeaTray** framework, adapted from the **IceTray** open source, among other internal software tools of ANTARES like **AntDST**. Less related with the researching are my working knowledge of Excel/Calc formulas, usage of Powerpoint/Beamer, Illustrator/Inkscape, Photoshop/GIMP, Flash/Action Script and working experience in Unix and Windows systems.

Language knowledge

English	Professional proficiency	<i>Conversationally fluent</i>
Spanish	Native proficiency	
French	Elementary proficiency	<i>Basic words and phrases mostly</i>
Catalan	Intermediate proficiency	<i>Good understanding but poor speaking</i>
Japanese	Basic proficiency	<i>Some words, reading and phrases only</i>

References

Juan José Hernández Rey IFIC <i>ANTARES</i> <i>ex-deputy spokesman</i> Instituto de Física Corpuscular, Edificio Institutos de Investigación, Apartado de Correos 22085, E-46071 Valencia (Spain) ☎ +34 96 354 35 36 ☎ +34 96 354 34 88 ✉ juanjo@ific.uv.es	Damien Dornic CPPM <i>ANTARES</i> <i>multi-messenger coordinator</i> Centre de Physique des Particules de Marseille, 163 avenue de Luminy, Case 902, 13288 cedex 09 Marseille (France) ☎ +33 4 91 82 76 82 ☎ +34 4 91 82 72 99 ✉ dornic@cppm.in2p3.fr	Paschal Coyle CPPM <i>ANTARES</i> <i>ex-spokesman</i> Centre de Physique des Particules de Marseille, 163 avenue de Luminy, Case 902, 13288 cedex 09 Marseille (France) ☎ +33 4 91 82 72 53 ☎ +34 4 91 82 72 99 ✉ coyle@cppm.in2p3.fr
--	--	--

Publication List

1. S. Adrián-Martínez et al. (The ANTARES Collaboration)
"Searches for Point-like and Extended Neutrino Sources Close to the Galactic Center Using the ANTARES Neutrino Telescope"
ApJL. Vol. 786 L5, pp. L14–L19 (2014)
2. Hans van Haren and The ANTARES Collaboration
"High-frequency internal wave motions at the ANTARES site in the deep Western Mediterranean"
OCEAN DYNAM. Vol. 64, Issue 4, pp. 507–517 (2014)
3. S. Adrián-Martínez et al. (The ANTARES Collaboration)
"A Search for Neutrino Emission from the Fermi Bubbles with the ANTARES Telescope"
EPJ C. Vol. 74:2701 (2014) [arXiv:1308.5260|astro-ph.HE]
4. S. Adrián-Martínez et al. (The ANTARES Collaboration)
"First results on dark matter annihilation in the Sun using the ANTARES neutrino telescope"
JCAP. Vol. JCAP11, pp. 032 (2013) [arXiv:1302.6516|astro-ph.HE]
5. S. Adrián-Martínez et al. (The ANTARES Collaboration)
"Measurement of the atmospheric ν_μ energy spectrum from 100 GeV to 200 TeV with the ANTARES telescope"
EPJ C. Vol. 73:2606 (2013) [arXiv:1308.1599|astro-ph.HE]
6. S. Adrián-Martínez et al. (The ANTARES Collaboration)
"Search for muon neutrinos from gamma-ray bursts with the ANTARES neutrino telescope using 2008 to 2011 data"
A&A. Vol. 559, A9 (2013) [arXiv:1307.0304|astro-ph.HE]
7. S. Adrián-Martínez et al. (The ANTARES Collaboration)
"Search for a Correlation between ANTARES Neutrinos and Pierre Auger Observatory UHECRs Arrival Directions"
ApJ. Vol. 774:19 (2013) [arXiv:1202.6661|astro-ph.HE]
8. C. Tamburini et al. (The ANTARES Collaboration)
"Deep-Sea Bioluminescence Blooms after Dense Water Formation at the Ocean Surface"
PLOS ONE. Vol. 8, e67523 (2013) [DOI:10.1371/journal.pone.0067523]
9. S. Adrián-Martínez et al. (The ANTARES Collaboration)
"A first search for coincident gravitational waves and high energy neutrinos using LIGO, Virgo and ANTARES data from 2007"
JCAP. Vol. 06, 008 (2013) [arXiv:1205.3018|astro-ph.HE]
10. S. Adrián-Martínez et al. (The ANTARES Collaboration)
"First search for neutrinos in correlation with gamma-ray bursts with the ANTARES neutrino telescope"
JCAP. Vol. 1303, 006 (2013) [arXiv:1302.6750|astro-ph.HE]
11. S. Adrián-Martínez et al. (The ANTARES Collaboration)
"Search for cosmic neutrino point sources with four year data of the ANTARES telescope"
ApJ. Vol. 760:53 (2012) [arXiv:1207.3105|hep-ex]
12. S. Adrián-Martínez et al. (The ANTARES Collaboration)
"The positioning system of the ANTARES neutrino telescope"
JINST. Vol. 7, T08002 (2012) [arXiv:1202.3894|astro-ph.IM]
13. S. Adrián-Martínez et al. (The ANTARES Collaboration)
"Search for neutrino emission from gamma-ray flaring blazars with the ANTARES telescope"
APh. Vol. 36, Issue 1, pp. 204–210 (2012) [arXiv:1111.3473|astro-ph.HE]

14. S. Adrián-Martínez et al. (The ANTARES Collaboration)
"Measurement of atmospheric neutrino oscillations with the ANTARES neutrino telescope"
PhL B. Vol. 714, Issues 2-5, pp. 224–230 (2012) [arXiv:1206.0645|hep-ex]
15. S. Adrián-Martínez et al. (The ANTARES Collaboration)
"Search for Relativistic Magnetic Monopoles with the ANTARES Neutrino Telescope"
APh. Vol. 35, pp. 634–640 (2012) [arXiv:1110.2656|astro-ph.HE]
16. S. Adrián-Martínez et al. (The ANTARES Collaboration)
"Measurement of the Group Velocity of Light in Sea Water at the ANTARES Site"
APh. Vol. 35, pp. 552–557 (2012) [arXiv:1110.5184|hep-ex]
17. M. Ageron et al. (The ANTARES Collaboration)
"The ANTARES Telescope Neutrino Alert System"
APh. Vol. 35, pp. 530–536 (2012) [arXiv:1103.4477|astro-ph.IM]
18. J. A. Aguilar et al. (The ANTARES Collaboration)
"A method for detection of muon induced electromagnetic showers with the ANTARES detector"
NIM A. Vol. 675, pp. 56–52 (2012) [arXiv:1106.0426|astro-ph.IM]
19. S. Adrián-Martínez et al. (The ANTARES Collaboration)
"First search for point sources of high energy cosmic neutrinos with the ANTARES neutrino telescope"
ApJL. Vol. 743, pp. L14–L19 (2011) [arXiv:1108.0292|astro-ph.HE]
20. Carlos J. Zapata-Rodríguez and Agustín Sánchez-Losa
"Three-dimensional field distribution in the focal region of low-Fresnel-number axicons"
JOSA A. Vol. 23, Issue 12, pp. 3016–3026 (2006) [DOI:JOSAA.23.003016]

Conference Contributions

1. **APP (TeVPA/IDM) 2014** | Amsterdam (Netherlands), 23–28 Jun 2014
Talk: "Search of a neutrino signal with the ANTARES telescope based on multi-messenger analyses"
(Proceedings of the Astroparticle Physics 2014).
2. **Bienal 2013** | Valencia (Spain), 15–19 Jul 2013
Talk: "Search for neutrino emission in gamma-ray flaring blazars with the ANTARES telescope"
Proceedings of the XXXIV Reunión Bienal de la RSEF. pp. 326–327
3. **ICRC 2013** | Rio de Janeiro (Brazil), 2–9 Jul 2013
Poster: "Search for neutrino emission of gamma-ray flaring blazars with the ANTARES telescope"
Proceeding published in Brazilian Journal of Physics.
4. **RICAP-13** | Roma (Italy), 22–24 May 2013
Talk: "Transient Point Source Analyses in the ANTARES Neutrino Telescope"
Proceeding published in NIM A. Vol. 742, pp. 195–198 (2014) [arXiv:1311.7596|astro-ph.HE]
5. **ISAPP Paris-2012** | Paris (France), 18–22 September 2012
Poster: "Using gamma-flares for cosmic neutrino analysis in ANTARES"
6. **VLVnT11** | Erlangen (Germany), 12–14 October 2011
Talk: "Search for neutrino emission in gamma-ray flaring blazars with the ANTARES telescope"
Proceeding published in NIM A. Vol. 725, pp. 60–63 (2013) [arXiv:1204.1447|astro-ph.HE]
7. **RNO8** | Alicante (Spain), 18–22 September 2006
Poster: "Reducción focal en microestructuras de perfil cónico"
Libro de Actas. Dep. Legal: B-42325-2006, VP-65

Collaboration Meeting Attendances & Contributions

1. **Leiden 2014** (ANTARES & KM3NeT) | Leiden (Netherlands), 19–23 May 2014 [*not assisted*]
Cont.: “Update of the Fermi Blazar time dependent analysis”
2. **Vilanova 2014** (ANTARES & KM3NeT) | Vilanova i la Geltrú (Spain), 17–21 February 2014
Talk: “Update of Time-Dependent Analysis (Blazars & All-sky/All-time)”
Cont.: “X-ray binaries Time-dependent search”
3. **MANTS 2013** (MANTS Workshop) | Garching (Germany), 14–15 October 2013
4. **Würzburg 2013** (ANTARES & KM3NeT) | Würzburg (Germany), 9–13 October 2013
Talk: “Time dependent analysis of Fermi and IACT blazar flares”
Cont.: “Search of neutrino around flares of the Crab Nebula”
5. **Marseilles 2013** (ANTARES) | Marseilles (France), 4–7 June 2013
Talk: “Time dependent analysis of Fermi and IACT blazar flares”
6. **Oujda 2013** (ANTARES) | Oujda (Morocco), 19–22 February 2013
Talk: “Time-dependent Flare Analysis”
7. **MANTS 2012** (MANTS Workshop) | Bologna (Italy), 6–7 October 2012
8. **Bologna 2012** (ANTARES & KM3NeT) | Bologna (Italy), 1–4 & 5 October 2012
Talk: “Update of the AGN flare’s analysis”
9. **Roma 2012** (ANTARES) | Roma (Italy), 7–10 May 2012
Talk: “Analysis of the FERMI/SWIFT Blazar flares”
Talk: “Update on time calibration with optical beacons”
10. **CERN 2012** (ANTARES) | Geneva (Switzerland), 6–9 February 2012
Talk: “Study on the improvement from beta information in the Likelihood”
Talk: “Update on time calibration with optical beacons”
11. **MANTS 2011** (MANTS Workshop) | Uppsala (Sweden), 24–25 September 2011
12. **Bamberg 2011** (ANTARES) | Bamberg (Germany), 19–22 September 2011
13. **Moscow 2011** (ANTARES) | Moscow (Russia), 6–10 June 2011
Talk: “Maximum likelihood block method for denoising gamma-ray light curve”
Talk: “News on time calibration”
14. **CERN 2011** (ANTARES) | Geneva (Switzerland), 7–10 February 2011
Talk: “News on time calibration”
15. **Amsterdam 2010** (ANTARES) | Amsterdam (Netherlands), 22–27 November 2010
Talk: “News on time calibration”
16. **MANTS 2010** (MANTS Workshop) | Paris (France), 24–25 September 2010
17. **Paris 2010** (ANTARES) | Paris (France), 20–24 September 2010
18. **2nd MultiDark Consolider Workshop** (Multidark) | Santander (Spain), 28–30 June 2010
19. **Gandía 2009** (ANTARES) | Gandía (Spain), 23–27 November 2009

Other Achievements

- **3 ANTARES shifts** of 1 week each performed: 19–25 May 2011, 9–15 January 2014 and 29 May – 4 June 2014.

Public Outreach

- IFIC's open day 24th May, 2014 (**Expociencia 2014**).
- Nikhef's open day 8th October, 2011 (**Open Dag Science Park 2011**).
- Guided visits to the ANTARES laboratory at IFIC (**2014**).