Scientific production ensuing from the theses defended on the PhD programme in Physics

Area of research: relativity and astrophysics

Year of viva	Doctorand	Thesis title
2018	David Martínez Gómez	High-frequency waves and instabilities in multi-fluid partially ionized solar plasmas

Ensuing scientific contributions

David Martínez-Gómez, Roberto Soler, and Jaume Terradas (2015). "Onset of the Kelvin-Helmholtz instability in partially ionized magnetic flux tubes", Astronomy and Astrophysics,578, A104. https://doi.org/10.1051/0004-6361/201525785

David Martínez-Gómez, Roberto Soler, and Jaume Terradas (2016). "Multi-fluid approach to high-frequency waves in plasmas. I. Small-amplitude regime in fully ionized medium", The Astrophysical Journal, 832:101. https://doi.org/10.3847/0004-637X/832/2/101

David Martínez-Gómez, Roberto Soler, and Jaume Terradas (2017). "Multi-fluid approachto high-frequency waves in plasmas. II. Small-amplitude regime in partially ionized media", The Astrophysical Journal, 837:80. https://doi.org/10.3847/1538-4357/aa5eab

David Martínez-Gómez, Roberto Soler, and Jaume Terradas (2018). "Multi-fluid approachto high-frequency waves in plasmas. III. Nonlinear regime and plasma heating", The Astrophysical Journal, 856:16. https://doi.org/10.3847/1538-4357/aab156

Maciej Zapiór and David Martínez-Gómez (2016). "Direct detection of the helical magneticfield geometry from 3D reconstruction of prominence knot trajectories", The Astrophysical Journal, 817:123. https://doi.org/10.3847/0004-637X/817/2/123

Year of viva	Doctorand	Thesis title
2019	Samuel Rial Lesaga	Temporal evolution of MHD waves in solar coronal arcades.

Ensuing scientific contributions

Rial, S., Arregui, I., Oliver, R. and Terradas, J. (2019). "Determining normal mode features from numerical simulations using CEOF analysis: I. Test case using transverse oscillations of a magnetic slab", ApJ 876(1), 86. doi: 10.3847/1538-4357/ab1417

Rial, S., Arregui, I., Terradas, J., Oliver, R. and Ballester, J. L. (2010). "Three-dimensional Propagation of Magnetohydrodynamic Waves in Solar Coronal Arcades", ApJ 713, 651661. doi: 10.1088/0004-637X/713/1/651

Rial, S., Arregui, I., Terradas, J., Oliver, R. and Ballester, J. L. (2013). "Wave Leakage and Resonant Absorption in a Loop Embedded in a Coronal Arcade", ApJ 763, 16. doi: 10.1088/0004-637X/763/1/16

Year of viva	Doctorand	Thesis title
2019	Miquel Oliver Almiñana	Gravitational wave data analysis for the advanced detector era.

Ensuing scientific contributions

Oliver, Miquel, David Keitel, and Alicia M. Sintes (2019). "The Adaptive Transient Hough method for long-duration gravitational wave transients", Physical Review D 99, 104067. DOI: https://doi.org/10.1103/PhysRevD.99.104067

Driggers, J. C. et al. (2019). "Improving astrophysical parameter estimation via offline noise subtraction for Advanced LIGO", Physical Review D99, 042001. doi: 10.1103/PhysRevD.99.042001

Oliver, Miquel et al. (2019). "Matched-filter study and energy budget suggest no detectable gravitational-wave 'extended emission' from GW170817", Monthly Notices of the Royal Astronomical Society, Volume 485, Issue 1, Pages 843–850. doi: 10.1093/mnras/stz439

Abbott, B. P. et al. (2018). "Search for gravitational waves from a long-lived remnant of the binary neutron star merger GW170817", The Astrophysical Journal Letters, Volume 851, Number 1. doi: 10.3847/2041-8213/aa9a35

Covas, P. B. et al. (2018). "Identification and mitigation of narrow sectral artifacts that degrade searches for persistent gravitational waves in the first two observing runs of Advanced LIGO". Physical Review 97, 082002. doi: 10.1103/PhysRevD. 97.082002

Abbott, Benjamin P. et al. (2018). "Full Band All-sky Search for Periodic Gravitational Waves in the O1 LIGO Data", Physical Review D97, 102003. doi: 10.1103/PhysRevD.97.102003

Walker, M. et al. (2017). “Effects of transients in LIGO suspensions on searches for gravitational waves”. In: Rev. Sci. Instrum. 88.12, p. 124501. doi: 10.1063/1. 5000264

Abbott, Benjamin P. et al. (2017). “All-sky Search for Periodic Gravitational Waves in the O1 LIGO Data”. Physical Review D96, 062002. doi: 10.1103/PhysRevD.96.062002.

Walsh, Sinead et al. (2016). “Comparison of methods for the detection of gravitational waves from unknown neutron stars”. Physical Review D94, 124010. doi: 10.1103/PhysRevD.94.124010

Year of viva	Doctorand	Thesis title
2019	Miguel Ángel Andrés Bezares Figueroa	Coalescence of Exotic Compact Objects in the new era of gravitational wave astronomy.

Ensuing scientific contributions

M. Bezares, C. Palenzuela and C. Bona (2017), “Final fate of compact boson star mergers”, Physical Review D, 95, Issue 12, p. 124005. DOI: 10.1103/PhysRevD.95.124005

C. Palenzuela, P. Pani, M. Bezares, V. Cardoso, L. Lehner, S. Liebling. (2017). “Gravitational Wave Signatures of Highly Compact Boson Star Binaries”, Physical Review D, 96, Issue 10, p. 104058. DOI: 10.1103/PhysRevD.96.104058

C. Palenzuela, B. Miñano, D. Vigano, A. Arbona, C. Bona-Casas, A.Rigo, M. Bezares, C. Bona and J. Massó (2018). “A Simflowny-based finite-difference code for high-performance computing in Relativity”, Classical and Quantum Gravity, Vol. 32, Number 18, 185007. DOI: 10.1088/1361-6382/aad7f6

M. Bezares and C. Palenzuela (2018). “Gravitational Waves from Dark Boson Star binary mergers”, Classical and Quantum Gravity, Volume 35, Number 23, 234002. DOI: 10.1088/1361-6382/aae87c

M. Bezares, D. Vigano and C. Palenzuela (2019). “Signatures of dark matter cores in binary neutron star mergers”, Physical Review D, Volume 100, Issue 4, id. 044049. DOI: 10.1103/PhysRevD.100.044049

G. Raposo, P. Pani, M. Bezares, C. Palenzuela and V. Cardoso (2019). “Anisotropic stars as ultracompact objects in General Relativity”. Physical Review D 99, 104072. DOI: https://doi.org/10.1103/PhysRevD.99.104072

C. Bona, M. Bezares, B. Pons and D. Vigano (2019). “3 + 2 Cosmology: unifying FRW metrics in the bulk”, Physical Review D 99, 043530. DOI: 10.1103/PhysRevD.99.043530

C. Bona and M. Bezares (2019). “Kaluza-Klein Cosmology: the bulk metric”, Physical Review D 100, 043509. DOI: https://doi.org/10.1103/PhysRevD.100.043509

Area of research: meteorology, physical oceanography and climate physics

Year of viva	Doctorand	Thesis title
2016	Juan Manuel Sayol España	On the complexity of upper ocean mesoscale Dynamics.

Ensuing scientific contributions

Sayol, J.M., Orfila, A., Simarro, G., López, C., Renault, L., Galán, A., Conti, D. (2013). Sea surface transport in the Western Mediterranean Sea: a Lagrangian perspective. Journal of Geophysical Research: Oceans 118(12), pp. 6371-6384

Sayol, J.M., Orfila, A., Oey, L.-Y. (2016) Wind induced energy-momentum distribution along the Ekman-Stokes layer. Application to the Western Mediterranean Sea climate. Deep Sea Research: part I 111, pp. 34-49

Sayol, J.M., Orfila, A., Simarro, G., Conti, D., Renault, L., Molcard, A. A Lagrangian model for tracking surface spills and SaR operations in the ocean. Environmental Modelling & Software 52(2), pp. 74-82

Bellomo, L., Griffa, A., Cosoli, S., Falco, P., Gerin, R., Iermano, I., Kalampokis, A., Kokkini, Z., Lana, A., Magaldi, G., Mamoutos, I., Mantovani, C., Marmain, J., Potiris, E., Sayol, J.M., Barbin, Y., Berta, M., Borghini, M., Bussani, A., Corgnati, L., Dagneaux, Q., Gaggelli, J., Guterman, P., Mallarino, D., Mazzoldi, A., Molcard, A., Orfila, A., Poulain, P.-M., Quentin, C., Tintor´e, J., Uttieri, M., Vetrano, A., Zambianchi, E., Zervakis, V. (2015) Toward an integrated HF radar network in the Mediterranean Sea to improve search and rescue and oil spill response: the TOSCA project experience. Journal of Operational Oceanography 8(2), 95-107

Orfila, A., Molcard, A., Sayol, J.M., Marmain, J., Bellomo, L., Quentin, C., Barbin, Y. (2015) Empirical Forecasting of HF-Radar Velocity Using Genetic Algorithms. Geoscience and Remote Sensing, IEEE Transactions 53(5), pp. 2875-2886

Hodges, B., Orfila, A., Sayol, J.M., Hou, X. (2015). Operational oil spill modelling: from science to engineering applications in the presence of uncertainty. Book title: Mathematical Modelling and Numerical Simulation of Oil Pollution Problems. Series: The Reacting Atmosphere vol. 2. Springer Verlag, Heidelberg. ISBN: 978-3-319- 16458-8

Sayol, J.M., Balaguer, P., Conti, D., Rietz, A., García-Sotillo, M., Simarro, G., Tintoré J., Orfila, A. (2014). Towards an Integrated Oil Spill System: from Modelling to the Decision Support Tool. Book title: Oil Spills: Environmental Prevention and Ecological Impacts. Nova Science Publishers, New York. ISBN: 978-1-63321-548-1

Year of viva	Doctorand	Thesis title
2017	Josep Llasses Gascón	Study of the uncertainties of Mediterranean Sea Climate Monitoring and Projections.

Ensuing scientific contributions

Llasses J, Jordà G, Gomis D (2015). Skills of different hydrographic networks in capturing changes in the Mediterranean Sea at climate scales. Climate Research, 63, 1 18. Doi: 10.3354/ cr01270

Llasses J, Jordà G, Gomis D, Adloff F, Macías D, Harzallah A, Arsouze T, Akthar N, Li L, Elizalde A, Sannino G. (2016). Heat and salt redistribution within the Mediterranean Sea in the Med CORDEX model ensemble. Climate Dynamics, 1 25. Doi: 10.1007/s003820163242 0

Llasses J, Jordà G, Gomis D. (2015). Reliability of uncertainty estimates from climate projection ensembles. Journal of Black Sea/Mediterranean Environment. Special Issue, 21-24

Gomis D , Álvarez Fanjul E , Jordà G , Marcos M , Aznar R , Rodríguez Camino E , Sánchez Perrino J.C. , RodríguezGonzález JM , Martínez Asensio A , Llasses J , Pérez B , G. Sotillo M. (2016). Regional marine climate scenarios in the NE Atlantic sector close to the Spanish shores. Scientia Marina 80(S1):215234. Doi: 10.3989/scimar.04328.07A

Year of viva	Doctorand	Thesis title
2018	Gemma Simó Diego	Effect of the surface thermal heterogeneities on the Atmospheric Boundary Layer.

Ensuing scientific contributions

Simó, G., Cuxart, J., Jiménez, M. A., Martínez-Villagrasa, D., Picos, R., López-Grifol, A., & Martí, B. (2019). Observed Atmospheric and Surface Variability on Heterogeneous

Terrain at the Hectometer Scale and Related Advective Transports. Journal of Geophysical Research: Atmospheres, 124(16), 9407-9422. DOI: https://doi.org/10.1029/2018JD030164

García-Santos, V., Cuxart, J., Jiménez, M. A., Martínez-Villagrasa, D., Simó, G., Picos, R., & Caselles, V. (2018). Study of Temperature Heterogeneities at Sub-Kilometric Scales and Influence on Surface–Atmosphere Energy Interactions. IEEE Transactions on Geoscience and Remote Sensing, 57(2), 640-654. DOI: 10.1109/TGRS.2018.2859182

Simó, G., Martínez-Villagrasa, D., Jiménez, M. A., Caselles, V., & Cuxart, J. (2019). Impact of the surface–atmosphere variables on the relation between air and Land Surface Temperatures. In Meteorology and Climatology of the Mediterranean and Black Seas (pp. 219-233). Birkhäuser, Cham. DOI: https://doi.org/10.1007/s00024-018-1930-x

Azeñas, V., Cuxart, J., Picos, R., Medrano, H., Simó, G., López-Grifol, A., & Gulías, J. (2018). Thermal regulation capacity of a green roof system in the mediterranean region: The effects of vegetation and irrigation level. Energy and Buildings, 164, 226-238. DOI: https://doi.org/10.1016/j.enbuild.2018.01.010

Simó, G., García-Santos, V., Jiménez, M. A., Martínez-Villagrasa, D., Picos, R., Caselles, V., & Cuxart, J. (2016). Landsat and local land surface temperatures in a heterogeneous terrain compared to modis values. Remote Sensing, 8(10), 849. DOI: https://doi.org/10.3390/rs8100849

Jiménez, M. A., Simó, G., Wrenger, B., Telisman-Prtenjak, M., Guijarro, J. A., & Cuxart, J. (2016). Morning transition case between the land and the sea breeze regimes. Atmospheric research, 172, 95-108. DOI: https://doi.org/10.1016/j.atmosres.2015.12.019

Year of viva	Doctorand	Thesis title
2019	Alejandra Rodríguez Enríquez	Physical and economic impacts due to sea level changes and wind-waves around the Balearic Islands.

Ensuing scientific contributions

Enríquez, A. R., Marcos, M., Alvarez-Ellacuría, A., Orfila, A., Gomis, D., 2017. Changes in beach shoreline due to sea level rise and waves under climate change scenarios application to the Balearic Islands. Natural Hazards and Earth System Sciences, 17, 1075-1089.

Enríquez, A. R., Marcos, M., Falqués, A., Roelvink, D., 2019. Assessing beach and dune erosion and vulnerability under sea level rise: a case study in the Mediterranean Sea. Frontiers in Marine Science, 6:4.

Enríquez, A. R., Bujosa, A., 2019. Measuring the economic impact of climateinduced environmental changes on sun-and-beach tourism. Under review in Climatic change.

Year of viva	Doctorand	Thesis title
2019	Diego Saúl Carrió Carrió	Implementation of a high-resolution ensemble Kalman filter system for the Western Mediterranean.

Ensuing scientific contributions

Carrió, D. S., & Homar, V. (2016). Potential of sequential EnKF for the short-range prediction of a maritime severe weather event. Atmospheric research, 178, 426-444. DOI: https://doi.org/10.1016/j.atmosres.2016.04.011

Amengual, A., Carrió, D. S., Ravazzani, G., & Homar, V. (2017). A comparison of ensemble strategies for flash flood forecasting: The 12 october 2007 case study in Valencia, Spain. Journal of Hydrometeorology, 18(4), 1143-1166. DOI: https://doi.org/10.1175/JHM-D-16-0281.1

Carrió, D. S., Homar, V., Jansa, A., Romero, R., & Picornell, M. A. (2017). Tropicalization process of the 7 November 2014 Mediterranean cyclone: Numerical sensitivity study. Atmospheric Research, 197, 300-312. DOI: https://doi.org/10.1016/j.atmosres.2017.07.018

Carrió, D. S., Homar, V., & Wheatley, D. M. (2019). Potential of an EnKF Storm-Scale Data Assimilation System Over Sparse Observation Regions with Complex Orography. Atmospheric Research, 216, 186-206. DOI: https://doi.org/10.1016/j.atmosres.2018.10.004

Year of viva	Doctorand	Thesis title
2020	Maria Esther Capó Truyols,	Submesoscale dynamics in the western Mediterranean Sea.

Ensuing scientific contributions

E Capó, A Orfila, JM Sayol, M Juza, MG Sotillo, D Conti, G Simarro (2016). Assessment of operational models in the Balearic Sea during a MEDESS-4MS experiment. Deep Sea Research Part II: Topical Studies in Oceanography 133, 118-131

Sotillo, M., Orfila, A. Rodríguez-Rubio, P., Cristobal Maraver, J., Conti, D., Padorno, E., Jiménez, J.A.., Capó, E., Pérez, F., Sayol, J.M., De Los Santos, F.J., Amo, A., Rietz, A., Troupin, C. Tintoré, J., Álvarez-Fanjul, E. (2016). The MEDESS-GIB database: tracking the Atlantic water inflow Earth System Science Data 8, 141-149 5

Capó, E., Orfila, A., Mason, E., Ruiz, S. (2019). Energy conversion routes in the Western Mediterranean Sea estimated from eddy–mean flow interactions. Journal of Physical Oceanography 49 (1), 247-267

Area of research: materials physics and engineering applications

Year of viva	Doctorand	Thesis title
2016	Beatriz Roselló Batle	Análisis de la energía consumida y las emisiones de CO2 durante el ciclo de vida de edificios del sector terciario y residencial situados en las Islas Baleares

Ensuing scientific contributions

Rosselló-Batle, B., Ribas, C., Moià-Pol, A., & Martínez-Moll, V. (2015). An assessment of the relationship between embodied and thermal energy demands in dwellings in a Mediterranean climate. *Energy and Buildings*, *109*, 230-244. DOI: https://doi.org/10.1016/j.enbuild.2015.10.007

Rossello-Batle, B., Ribas, C., Moia-Pol, A., & Martínez-Moll, V. (2015). Saving potential for embodied energy and CO2 emissions from building elements: A case study. *Journal of Building Physics*, *39*(3), 261-284. DOI: https://doi.org/10.1177/1744259114543982

Rosselló-Batle, B., Moià, A., Cladera, A., & Martínez, V. (2010). Energy use, CO2 emissions and waste throughout the life cycle of a sample of hotels in the Balearic Islands. *Energy and Buildings*, *42*(4), 547-558. DOI: https://doi.org/10.1016/j.enbuild.2009.10.024

Year of viva	Doctorand	Thesis title
2019	Julian David Hertel	Study on the general applicability of the collector efficiency model to solar process heat collectors.

Ensuing scientific contributions

Hertel, J. D., Martinez-Moll, V., & Pujol-Nadal, R. (2015). Estimation of the influence of different incidence angle modifier models on the biaxial factorization approach. *Energy conversion and management*, *106*, 249-259. DOI: https://doi.org/10.1016/j.enconman.2015.08.082

Hertel, J. D., Martinez-Moll, V., & Pujol-Nadal, R. (2016). Influence of thermal losses on the incidence angle modifier factorization approach. Solar Energy, 135, 50-58. DOI: https://doi.org/10.1016/j.solener.2016.05.035

Hertel, J. D., Bonnín-Ripoll, F., Martínez-Moll, V., & Pujol-Nadal, R. (2018). Incidence-angle-and wavelength-resolved ray-tracing simulations of a linear Fresnel collector using the in-house software OTSun. Journal of Solar Energy Engineering, 140(3). DOI: https://doi.org/10.1115/1.4039329

Year of viva	Doctorand	Thesis title
2019	Nicolás Pérez de la Mora	Generation and supply optimisation of a power plant and DHC network.

Ensuing scientific contributions

Pérez-Mora, N., Lazzeroni, P., Martínez-Moll, V., & Repetto, M. (2017). Optimal management of a complex DHC plant. Energy Conversion and Management, 145, 386-397. DOI: https://doi.org/10.1016/j.enconman.2017.05.002

Perez-Mora, N., Bava, F., Andersen, M., Bales, C., Lennermo, G., Nielsen, C., ... & Martínez-Moll, V. (2018). Solar district heating and cooling: A review. International Journal of Energy Research, 42(4), 1419-1441. DOI: https://doi.org/10.1002/er.3888

Perez-Mora, N., Lazzeroni, P., Martínez-Moll, V., & Repetto, M. (2018). Optimal DHC energy supply harnessing its thermal mass. Applied Thermal Engineering, 133, 520-531. DOI: https://doi.org/10.1016/j.applthermaleng.2018.01.072

Year of viva	Doctorand	Thesis title
2019	Joan Maria Rius Gibert	Active shear strengthening of reinforced concrete beams using Ni-Ti-Nb shape memory alloys.

Ensuing scientific contributions

Rius, J. M., Cladera, A., Ribas, C., & Mas, B. (2019). Shear strengthening of reinforced concrete beams using shape memory alloys. Construction and Building Materials, 200, 420-435. DOI: https://doi.org/10.1016/j.conbuildmat.2018.12.104

ES2592554 (B1)- Cladera Bohigas, Antoni; Ribas González, Carlos Rodrigo; Mas Gracia, Benito; Rius Gibert, Juan Maria. "Método de refuerzo activo frente a esfuerzo cortante o punzonamiento en elementos portantes estructurales, y sistema de refuerzo active", Spain. University of the Balearic Islands, 2016. Patent. https://patents.google.com/patent/ES2592554A1

Area of research: quantum mechanics and statistical physics

Year of viva	Doctorand	Thesis title
2017	Maria Isabel Alomar Bennàssar	Spin and charge transport in thermally and ac driven nanodevices.

Ensuing scientific contributions

Alomar, M.A., Lim, J-S., & Sánchez, D., (2016). Coulomb-blockade effect in nonlinear mesoscopic capacitors, Phys. Rev. B 94, 165425. DOI: 10.1103/PhysRevB.94.165425

Alomar, M.A., Serra, Ll., & Sánchez, D., (2016). Interplay between resonant tunneling and spin precession oscillations in all-electric all-semiconductor spin transistors, Phys. Rev. B 94, 075402. DOI: https://doi.org/10.1103/PhysRevB 94.075402

Alomar, M.A., Serra, Ll., & Sánchez, D., (2015). Seebeck effects in two-dimensional spin transistors. Phys. Rev. B 91, 075418. DOI: https://doi.org/10.1103/PhysRevB.91.075418

Alomar, M.A., & Sánchez, D., (2014). Thermoelectric effects in graphene with local spin-orbit interaction, Phys. Rev. B 89, 115422. DOI: https://doi.org/10.1103/PhysRevB.89.115422

Year of viva	Doctorand	Thesis title
2019	Guillem Rosselló Rosselló	Heat and charge transport in nanostructures: interference, AC-driving, environment, and feedback.

Ensuing scientific contributions

Rosselló, G., Battista, F., Moskalets, Michael., & Splettstoesser, J. (2015). Interference and multiparticle effects in a Mach-Zehnder interferometer with single-particle sources. Physical Review B 91 (11), 115438. DOI: https://doi.org/10.1103/PhysRevB.91.115438

Rosselló, G., López, R., & Sánchez, R., (2017). Dynamical Coulomb blockade of thermal transport. Physical Review B 95 (23), 235404. DOI: https://doi.org/10.1103/PhysRevB.95.235404

Rosselló, G., López, R., & Lim, J-S., (2015). Time-dependent heat flow in interacting quantum conductors. Physical Review B 92 (11), 115402. DOI: https://doi.org/10.1103/PhysRevB.92.115402

Rosselló, G., López R., & Platero, G., (2017). Chiral Maxwell demon in a quantum Hall system with a localized impurity. Physical Review B 96 (7), 075305. DOI: https://doi.org/10.1103/PhysRevB.96.075305

Year of viva	Doctorand	Thesis title
2019	Miguel Ambrosio Sierra Seco de Herrera	Electrically and thermally driven transport in interacting quantum dot structures.

Ensuing scientific contributions

Sierra, M. A., & Sánchez, D., (2014). Strongly nonlinear thermovoltage and heat dissipation in interacting quantum dots, Phys. Rev. B 90, 115313. DOI: https://doi.org/10.1103/PhysRevB.90.115313

Sierra, M. A., López, R., & Sánchez, D., (2017). Fate of the spin-1/2 Kondo effect in the presence of temperature gradients. Phys. Rev. B 96, 085416. DOI: https://doi.org/10.1103/PhysRevB.96.085416.

Sierra, M. A., & Sánchez, D., (2015). Nonlinear Heat Conduction in Coulomb-blockaded Quantum Dots. Materials Today: Proceedings 2, 483. DOI: https://doi.org/10.1016/j.matpr.2015.05.066

Sierra, M.A., Saiz-Bretin, M. Dominguez-Adame, F., & Sánchez, D., (2016). Interactions and thermoelectric effects in a parallel-coupled double quantum dot, Phys. Rev. B 93, 235452. DOI: https://doi.org/10.1103/PhysRevB.93.235452

Sierra, M.A., & Sánchez, D., (2017). Heat current through an artificial Kondo impurity beyond linear response, J. Phys.: Conf. Ser. 969, 012144. DOI: 10.1088/1742-6596/969/1/012144

Sierra, M.A., Sánchez, D., Garrigues, A. R., Del Barco, E., Wang, L., & Nijhuis, & C. A., (2018). How to distinguish between interacting and noninteracting molecules in tunnel junctions. Nanoscale 10, 3904. DOI: 10.1039/C7NR05739C

Sierra, Miguel. A., López, R., & Lim, J-S., (2018). A thermally driven out-of-equilibrium two-impurity Kondo system. Phys. Rev. Lett. 121, 096801. DOI: https://doi.org/10.1103/PhysRevLett.121.096801

Sierra, M. A., Sánchez, D., Jauho, Antti-Pekka., & Kassbjerg, K.,(2009). Fluctuation-driven Coulomb drag in interacting quantum dot systems. Phys. Rev. B 100, 081404. DOI: https://doi.org/10.1103/PhysRevB.100.081404

Sierra, M. A., Sánchez, D., Gutierrez, R., Cuniberti, G., Dominguez-Adame, F., & Díaz, E., (2020). Spin-polarized electron transmission in DNA-like systems. Biomolecules 10, 49 (2020). DOI: https://doi.org/10.3390/biom10010049

Year of viva	Doctorand	Thesis title
2020	Daniel Chaparro González	Study of the Generation of Optical Pulses by Mode-Locking in Semiconductor Lasers for Applications in LiDAR Systems.

Ensuing scientific contributions

Chaparro, D., & Balle, S., (2018). Optical Addressing of Pulses in a Semiconductor-Based Figure-of-Eight Fiber Laser. Physical Review Letters, 120, 064101. DOI: 10.1103/PhysRevLett.120.064101

Chaparro, D., Furfaro, L., & Balle, S., (2017). 247 fs Time-localized structures from a passively mode-locked figure-of-eight semiconductor laser. Conference on Lasers and Electro-Optics Europe & European Quantum Electronics Conference (CLEO/Europe-EQEC). DOI: 10.1109/CLEOE-EQEC.2017.8087528

Chaparro, D., Furfaro, L., & Balle, S., (2017). Subpicosecond pulses in a selfstarting mode-locked semiconductor-based figure-of-eight fiber laser. Photonics Research 5, 37-40. DOI: 10.1364/PRJ.5.000037

Marconi, M., Camelin, P., Barland, S., Giudici, M., Javaloyes, J., Chaparro, D., & Balle, S., (2015). Temporal localized states in semiconductors (II): from mode-locking to localized pulses. Spatiotemporal Complexity in Nonlinear Optics (SCNO). DOI: 10.1109/SCNO.2015.7324011

Marconi, M., Camelin, S., Giudici, M., Javaloyes, Chaparro, D., & Balle, S., (2016). Localized pulses in passively mode-locked semiconductor lasers. Photonics North (PN). DOI: 10.1109/PN.2016.7537880

Marconi, M., Javaloyes, J., Camelin, P., González, D.C., Balle, S.,& Giudici., (2015). Control and Generation of Localized Pulses in Passively Mode-Locked Semiconductor Lasers. IEEE Journal of Selected Topics in Quantum Electronics, 21, 30. DOI: 10.1109/JSTQE.2015.2435895

Area of research: interdisciplinary physics and non-linear physics

Year of viva	Doctorand	Thesis title
2018	Eder Batista Tchawou Tchuisseu	Complex dynamics in power grids.

Ensuing scientific contributions

Tchuisseu, E. T., Gomila, D., Brunner, D., & Colet, P. (2017). Effects of dynamic-demand-control appliances on the power grid frequency. Physical Review E, 96(2), 022302. DOI: https://doi.org/10.1103/PhysRevE.96.022302

Tchuisseu, E. B. T., Gomila, D., Colet, P., Witthaut, D., Timme, M., & Schäfer, B. (2018). Curing Braess' paradox by secondary control in power grids. New Journal of Physics, 20(8), 083005. DOI: https://doi.org/10.1088/1367-2630/aad490

Tchuisseu, E. T., Gomila, D., & Colet, P. (2019). Reduction of power grid fluctuations by communication between smart devices. International Journal of Electrical Power & Energy Systems, 108, 145-152. DOI: https://doi.org/10.1016/j.ijepes.2019.01.004

Year of viva	Doctorand	Thesis title
2019	Julián Bueno Moragues	Photonic Information Processing.

Ensuing scientific contributions

Bueno, J., Brunner, D., Soriano, M. C., & Fischer, I. (2017). Conditions for reservoir computing performance using semiconductor lasers with delayed optical feedback. Optics express, 25(3), 2401-2412. DOI: https://doi.org/10.1364/OE.25.002401

Bueno, J., Maktoobi, S., Froehly, L., Fischer, I., Jacquot, M., Larger, L., & Brunner, D. (2018). Reinforcement learning in a large-scale photonic recurrent neural network. Optica, 5(6), 756-760. DOI: https://doi.org/10.1364/OPTICA.5.000756

Argyris, A., Bueno, J., & Fischer, I. (2018). Photonic machine learning implementation for signal recovery in optical communications. Scientific reports, 8(1), 1-13. DOI: https://doi.org/10.1038/s41598-018-26927-y

Area of research: physics of complex systems

Year of viva	Doctorand	Thesis title
2018	Jorge Pablo Rodríguez García	The complexity of movement: empirical data analysis and modelling of dynamical processes.

Ensuing scientific contributions

JP Rodríguez, J Fernández-Gracia, M Thums, MA Hindell, AMM Sequeira, MG Meekan, DP Costa, C Guinet, RG Harcourt, CR McMahon, M Muel bert, CM Duarte, and VM Eguíluz. Big data analyses reveal patterns and drivers of the movements of southern elephant seals. Scientific Reports, 7(1): 112, 2017.

JP Rodríguez, F Ghanbarnejad, and VM Eguíluz. Risk of Coinfection Outbreaks in Temporal Networks: A Case Study of a Hospital Contact Network. Frontiers in Physics, 5: 46, 2017.

JP Rodríguez, YH Liang, YJ Huang, and J Juang. Diversity of hysteresis in a fully cooperative coinfection model. Chaos, 28(2): 023107, 2018.

AMM Sequeira et al, Convergence of marine megafauna movement patterns in coastal and open oceans. Proceedings of the National Academy of Sciences, 115(12): 3072-3077, 2018.

Year of viva	Doctorand	Thesis title
2019	Pedro Monroy Pérez	Lagrangian studies of sedimentation and transport. Impact on marine ecosystems.

Ensuing scientific contributions

Monroy, P., Drotos, G., Hernández-García, E., & López, C. (2019). Spatial inhomogeneities in the sedimentation of biogenic particles in ocean flows: Analysis in the Benguela region. *Journal of Geophysical Research: Oceans*, *124*(7), 4744-4762. DOI: https://doi.org/10.1029/2019JC015016

Hidalgo, M., Rossi, V., Monroy, P., Ser-Giacomi, E., Hernández-García, E., Guijarro, B., ... & Reglero, P. (2019). Accounting for ocean connectivity and hydroclimate in fish recruitment fluctuations within transboundary metapopulations. *Ecological Applications*, *29*(5), e01913. DOI: **https://doi.org/10.1002/eap.1913**

Drótos, G., Monroy, P., Hernández-García, E., & López, C. (2019). Inhomogeneities and caustics in the sedimentation of noninertial particles in incompressible flows. *Chaos: An Interdisciplinary Journal of Nonlinear Science*, *29*(1), 013115. DOI: https://doi.org/10.1063/1.5024356

Monroy, P., Hernández-García, E., Rossi, V., & López, C. (2016). Modeling the dynamical sinking of biogenic particles in oceanic flow. *arXiv preprint arXiv:1612.04592*.

Monroy, P., Rossi, V., Ser-Giacomi, E., López, C., & Hernández-García, E. (2017). Sensitivity and robustness of larval connectivity diagnostics obtained from Lagrangian Flow Networks. *ICES Journal of Marine Science*, *74*(6), 1763-1779. DOI: https://doi.org/10.1093/icesjms/fsw235

Year of viva	Doctorand	Thesis title
2019	Daniel Ruiz Reynés	Dynamics of Posidonia oceanica meadows.

Ensuing scientific contributions

Ruiz-Reynés, D., Gomila, D., Sintes, T., Hernández-García, E., Marbà, N., & Duarte, C. M. (2017). Fairy circle landscapes under the sea. Science advances, 3(8), e1603262. DOI: https://doi.org/10.1126/sciadv.1603262

Ruiz-Reynés, D., & Gomila, D. (2019). Distribution of growth directions in meadows of clonal plants. Physical Review E, 100(5), 052208. DOI: https://doi.org/10.1103/PhysRevE.100.052208

Ruiz-Reynés, D., Schönsberg, F., Hernández-García, E., & Gomila, D. (2019). A simple model for pattern formation in clonal-growth plants. arXiv preprint arXiv:1908.04603. https://arxiv.org/abs/1908.04603

Year of viva	Doctorand	Thesis title
2019	Aleix Bassolas Esteban	A journey across the multiple scales of human mobility.

Ensuing scientific contributions

Lenormand, M., Bassolas, A., & Ramasco, J. J. (2016). Systematic comparison of trip distribution laws and models. Journal of Transport Geography, 51, 158-169. DOI: https://doi.org/10.1016/j.jtrangeo.2015.12.008

Bassolas, A., Lenormand, M., Tugores, A., Gonçalves, B., & Ramasco, J. J. (2016). Touristic site attractiveness seen through Twitter. EPJ Data Science, 5(1), 12. DOI: https://doi.org/10.1140/epjds/s13688-016-0073-5

Bassolas, A., Ramasco, J. J., Herranz, R., & Cantú-Ros, O. G. (2019). Mobile phone records to feed activity-based travel demand models: MATSim for studying a cordon toll policy in Barcelona. Transportation Research Part A: Policy and Practice, 121, 56-74. DOI: https://doi.org/10.1016/j.tra.2018.12.024

Mazzoli, M., Molas, A., Bassolas, A., Lenormand, M., Colet, P., & Ramasco, J. J. (2019). Field theory for recurrent mobility. Nature communications, 10(1), 1-10. DOI: https://doi.org/10.1038/s41467-019-11841-2

Bassolas, A., Barbosa-Filho, H., Dickinson, B., Dotiwalla, X., Eastham, P., Gallotti, R., ... & Kucuktunc, O. (2019). Hierarchical organization of urban mobility and its connection with city livability. Nature communications, 10(1), 1-10. DOI: https://doi.org/10.1038/s41467-019-12809-y

Bassolas, A., Gallotti, R., Lamanna, F., Lenormand, M., & Ramasco, J. J. (2020). Scaling in the recovery of urban transportation systems from massive events. Scientific reports, 10(1), 1-13. DOI: https://doi.org/10.1038/s41598-020-59576-1