Reconocimiento oficial de dos quinquenios de mi docencia por la Universitat Politècnica de València

UNIVERSITAT POLITÈCNICA DE VALÈNCIA

Resolución de Reconocimiento de Componente de Méritos Docentes

Realizada, con carácter favorable, la evaluación de los méritos docentes solicitada por el Profesor/a D. Pau Amaro Seoane D.N.I. nº. 22573146A en el período comprendido entre el 01/09/2001 y el 31/12/2024

Este Rectorado ha resuelto, en aplicación del Real Decreto 1086/89, de 28 de agosto, sobre retribuciones del profesorado universitario, y de los criterios aprobados por acuerdo del Consejo de Gobierno de esta Universitat, con fecha 28 de septiembre de 2023, relativa a la evaluación de tramos docentes, concederle el/los siguiente/s componente por Méritos Docentes:

Período	Inicio	Fin	Nivel	Fam. C/C/E	Ev.Fav.	Ef. Económ
1	01/09/2001	15/08/2015	27	TU	S	01/01/2025
2	16/08/2015	31/12/2024	27	TU	S	01/01/2025

Siempre que no haya cumplido Ud. el máximo de 6 tramos, o esté en disposición/cumpla los requisitos para solicitar la permuta aprobada en los criterios antes mencionados, el próximo periodo de cinco años se computará a partir de la fecha 01/01/2025

En caso de que el/los tramo/s reconocido/s en la presente resolución sean por permuta, en base a los criterios aprobados por el acuerdo de Consejo de Gobierno de 28 de septiembre de 2023 antes mencionado, se procederá a la anulación en su expediente personal del/los tramo/s permutado/s con efectos de 31 de diciembre aceptando así su renuncia expresa.

Contra la presente Resolución, que pone fin a la vía administrativa, la persona interesada podrá interponer recurso contencioso administrativo ante el Juzgado de lo Contencioso-Administrativo correspondiente, en el plazo de dos meses contados desde el día siguiente al de la recepción de su notificación. Asimismo, con carácter potestativo, se podrá interponer recurso de reposición, en el plazo de un mes desde el día siguiente al de la notificación, ante el mismo órgano que ha dictado la resolución. Todo ello de conformidad con lo establecido en los artículos 112, 114, 115, 123 y 124 de la Ley 39/2015, de 1 de octubre, del Procedimiento Administrativo Común de las Administraciones Públicas y los artículos 8, 14.2 y 46 de la Ley 29/1998, de 13 de julio, reguladora de la Jurisdicción Contencioso-Administrativa.

Valencia, a la fecha de la firma

EL RECTOR

José E. Capilla Romá

Firmado porJOSE ESTEBAN CAPILLA ROMA - DNI ***8293**
- Cargo: Rector - 03/06/2025 15:54:00

Docencia realizada en la Universitat Politècnica de València

La Universitat Politècnica de València,

HACE CONSTAR

Que la información contenida en el presente certificado de D./Dª Pau Amaro Seoane con DNI 22573146, adscrito/a al Dpto. de Matemática Aplicada y área de conocimiento Matematica Aplicada, ha sido obtenida de las bases de datos institucionales de la universidad

ACTIVIDAD DOCENTE O PROFESIONAL

DEDICACIÓN DOCENTE

Total de horas de docencia impartida: 524 horas

Codificación
R: Responsable de Asignatura

Clasificación Teoría/Práctica:
- **TA: Teoría de aula**
- **PA: Prácticas de aula**
- **PL: Prácticas de laboratorio**

Cuatrimestres: A primero, B segundo, T anual

Curso académico	Cat. Profes.	Asignatura	Responsable	Titulación; Cuatrimestres	Curso de la titul.	Teoría/ Práctica; Idiomas	Horas tot. impartidas por el interesado	Horas tot. impartidas por curso
2020	Personal Investigador postdoctoral	Matemáticas I (12557)		Grado en Ingeniería Mecánica; T	1	PL; Castellano	60	60
2022	Profesor/a Titular de Universidad	Matemáticas I (11994)	R	Grado en Ingeniería Eléctrica; T	1	TA; Castellano	22,5	111,5
	Profesor/a Titular de Universidad	Matemáticas I (11994)	R	Grado en Ingeniería Eléctrica; T	1	PA; Castellano	5	
	Profesor/a Titular de Universidad	Matemáticas I (11994)	R	Grado en Ingeniería Eléctrica; T	1	PI; Castellano	51,5	
	Profesor/a Titular de Universidad	Matemáticas I (12131)		Grado en Ingeniería Electrónica Industrial y Automática; T	1	PA; Castellano	5	
	Profesor/a Titular de Universidad	Matemáticas I (12557)		Grado en Ingeniería Mecánica; T	1	TA; Castellano	22,5	

Curso académico	Cat. Profes.	Asignatura	Responsable	Titulación; Cuatrimestres	Curso de la titul.	Teoría/ Práctica; Idiomas	Horas tot. impartidas por el interesado	Horas tot. impartidas por curso
	Profesor/a Titular de Universidad	Matemáticas I (12557)		Grado en Ingeniería Mecánica; T	1	PA; Castellano	5	
2023	Profesor/a Titular de Universidad	Matemáticas I (11871)		Grado en Ingeniería Aeroespacial; T	1	TA; Inglés	30	160
	Profesor/a Titular de Universidad	Matemáticas I (11871)		Grado en Ingeniería Aeroespacial; T	1	PA; Inglés	15	
	Profesor/a Titular de Universidad	Matemáticas I (12131)		Grado en Ingeniería Electrónica Industrial y Automática; T	1	TA; Castellano	22,5	
	Profesor/a Titular de Universidad	Matemáticas I (12131)		Grado en Ingeniería Electrónica Industrial y Automática; T	1	PA; Castellano	10	
	Profesor/a Titular de Universidad	Matemáticas I (12131)		Grado en Ingeniería Electrónica Industrial y Automática; T	1	PI; Castellano	12,5	
	Profesor/a Titular de Universidad	Matemáticas I (12557)		Grado en Ingeniería Mecánica; T	1	TA; Castellano	22,5	
	Profesor/a Titular de Universidad	Matemáticas I (12557)		Grado en Ingeniería Mecánica; T	1	PA; Castellano	10	
	Profesor/a Titular de Universidad	Matemáticas I (12557)		Grado en Ingeniería Mecánica; T	1	PL; Castellano	37,5	
2024	Profesor/a Titular de Universidad	Matemáticas I (12131)		Grado en Ingeniería Electrónica Industrial y Automática; T	1	TA; Castellano, Inglés	67,5	192,5
	Profesor/a Titular de Universidad	Matemáticas I (12131)		Grado en Ingeniería Electrónica Industrial y Automática; T	1	PA; Castellano, Inglés	30	
	Profesor/a Titular de Universidad	Matemáticas I (12131)		Grado en Ingeniería Electrónica Industrial y Automática; T	1	PI; Castellano, Inglés	25	

Curso académico	Cat. Profes.	Asignatura	Responsable	Titulación; Cuatrimestres	Curso de la titul.	Teoría/ Práctica; Idiomas	Horas tot. impartidas por el interesado	Horas tot. impartidas por curso
	Profesor/a Titular de Universidad	Matemáticas I (12557)		Grado en Ingeniería Mecánica; T	1	TA; Castellano	50	
	Profesor/a Titular de Universidad	Matemáticas I (12557)		Grado en Ingeniería Mecánica; T	1	PA; Castellano	20	

Comentarios (anónimos) sobre mi enseñanza en la UPV València

En la UPV el alumnado tuvo la posibilidad el curso académico pasado (2023-2024) de dejar un comentario anónimo sobre el profesorado. Dejo aquí la lista **íntegra** de los comentarios que me hicieron los alumnos.

Lamentablemente algún profesor recibió comentarios muy desagradables, por lo que se dejó de realizar esta recogida de comentarios anónimos.

GRUP TA-1

Total de felicitacions:	16
% d'alumnes que feliciten	38,1%

Comentari 13: Creo que este profesor ha demostrado que tiene verdadero interés en que aprendamos realmente matemáticas y a pensar por nuestra cuenta a diferencia de otros. Además, siempre que hemos necesitado una clase extra aun fuera del horario se ha ofrecido y nos ha ayudado a desarrollar nuestra pasión por la física con algunas charlas que nos ha dado en el IMM.

Comentari 14: Trata de que comprendamos en profundidad el temario. No se trata de una mera tarea de memorización como sucede con otros profesores de esta asignatura, sino que, nos ayuda a enfrentarnos de forma racional a cada problema. En resumen, nos ayuda a desarrollar nuestro espíritu crítico.

Comentari 15: De los únicos profesores que intenta desempeñar el rol de profesor ideal. Su única preocupación es nuestro aprendizaje y eso lo valoro mucho. Lamentablemente, debido a ciertas situaciones no se puede adaptar al programa lectivo de la asignatura de matemáticas. Debería de haber mas profesores así.

Comentari 16: si

Comentari 12: De los pocos profesores que atiende nuestras sugerencias y vela por nuestro bien, además que intenta dar todo aunque no se pueda debido a la programación.

Comentari 11: Un maquina.

Comentari 10: se involucra muchísimo en la asignatura, nos da charlas sobre astrofísica, clases extra, nos trae a premios nobel... en fin, así sí.

Comentari 1: El profesor ha peleado por rescatar la labor fallida de otros profesores de la asignatura y por impartir la materia lo mejor que ha podido, fomentando el conocimiento más allá de lo impartido en el aula.

Comentari 9: Es un privilegio poder asistir a las clases de Pau Amaro, porque a pesar de no tener una programación rigurosa, se aprende a la perfección todo lo que imparte y se interesa por facilitar la comprensión de la materia. Puede ser que por ello, para poder resolver cada duda e intentar ayudarnos, el tiempo no ha sido suficiente, pero se agradece todo el esfuerzo por hacernos aprender y habernos enseñado más allá de un libro.

Comentari 8: El señor Amaro ha logrado despertar en sus alumnos la curiosidad, y junto a ella nos ha animado a rechazar al conformismo. No solo nos ha enseñado a realizar los ejercicios, si no que también nos ha hecho comprender que las matemáticas hay que comprenderlas, y no debemos quedarnos callados sin preguntar dudas, preguntar siempre el porqué. Ver aplicaciones de las matemáticas en el campo aeroespacial han motivado en mi una motivación que no tenía por la asignatura. Cabe destacar que el Señor Amaro está más que dispuesto a invertir sus horas libres en impartir clases, tutorías o repasos para todos aquellos que nos veamos más perdidos, o simplemente para reforzar conocimientos que se dan por sabidos y en los cuales no tenemos una base muy sólida.

Comentari 2: Es un profesor que se preocupa porque los conocimientos adquiridos perduren en el tiempo ya que se esfuerza por que comprendamos el principio en el que se fundamentan. Transmite una pasión inigualable por la asignatura y a brindado experiencias en clase y fuera de ella únicas a los alumnos .

Comentari 3: Hoy en día se encuentran pocos profesores con la iniciativa y la pasión del Señor Amaro. Mientras otros profesores de la misma asignatura se dedican a demostrar que saben matemáticas delante de nosotros, el Señor Amaro se preocupa por que entendamos los contenidos y no seamos robots, es decir, que nos aprendamos las fórmulas de memoria para poder decir que sabemos hacer algo, sin saberlo en verdad.
El Señor Amaro no utilizas contenidos audiovisuales, pero a quién se le ocurriría utilizar una presentación de PowerPoint para enseñar matemáticas, por no hablar del libro escrito en lenguaje matemático, que nadie entiende.
Nunca un profesor me había dicho lo siguiente: "Si usted no entiende las cosas, no es porque sea tonto, sino porque yo estoy haciendo mal su trabajo."
Felicidades, Señor Amaro.

Comentari 4: Es un profesor que logra despertar el interés por la asignatura y aporta diferentes métodos y puntos de vista. Se ve que quiere que todos sus alumnos se sientan cómodos preguntando y resuelve todas las dudas que tengamos, además de hacer tiempo para resolver cualquier pregunta.

Comentari 5: Dedica mucho tiempo y esfuerzo para que sus estudiantes consigan comprender la materia impartida. Ademas, ofrece charlas extra, empleando su poco tiempo en desarrollar la pasion de sus estudiantes por la materia.

Comentari 6: Es un profesor que se dedica a ENSEÑAR los conceptos, de manera que el alumno los comprende de verdad, lucha contra el sistema de enseñanza actual basado en el aprendizage de formulas y conceptos de memoria.

Comentari 7: Un profesor muy aplicado con un conocimiento brutal. Clases muy interesantes.

Comentari 1: Alta implicación en lo que hace

Comentari 8: Me parece que motiva a los alumnos y les anima a entender la materia y no solo aprender a hacer sistemáticamente el problema.

Comentari 9: Es como un motor de Ferrari instalado en un cuatriciclo ligero; un profesor que supera con creces las expectativas, aunque en una asignatura que le viene pequeña.

GRUP PL-2

Total de felicitacions:	1
% d'alumnes que feliciten	50,0%

Comentari 10: Domina la materia que imparte y sus clases son muy interesantes, el mejor profesor que he tenido

GRUP PL-3

Total de felicitacions:	0
% d'alumnes que feliciten	0,0%

GRUP TA-2/PA-2

Total de felicitacions:	6
% d'alumnes que feliciten	15,0%

Comentari 6: Al principio pensaba que iba a ser mal profesor pero poco a poco me ha ido pareciendo mucho mejor y he ido entendiéndole mejor

Comentari 5: Creo que, en algunos aspectos, despierta una motivación en el alumnado para comprender y entender conceptos por su cuenta, más allá de lo impartido en clase.

Comentari 4: Me gusta mucho su manera de enseñar, parece importarle más enseñarle algo a sus alumnos que simplemente dar una clase magistral .

Comentari 3: Se nota que domina mucho la materia que imparte pero no me gusta la desorganización a la hora de dar el temario. Asi como la ausencia de material en poliformat.

Comentari 7: Logra transmitir una motivación hacia la asignatura gracias a su pasión por lo que enseña, y gracias a que busca que entendamos el temario en vez de memorizarlo logra que los conocimientos aprendidos perduren de una forma clara.

Comentari 2: Se interesa mucho por que los alumnos aprendan de verdad la asignatura.

Comentari 11: Don Pau, a parte de enseñar matemáticas enseña a pensar y tener pensamiento crítico, haciendo que el alumnado se cuestione sobre bases que una vez fueron absolutas pero que ahora, desde nuestro punto de vista, nos hacen pensar y reflexionar para llegar a la conclusión correcta y adecuada.

GRUP TA-1/PA-1

Total de felicitacions:	10
% d'alumnes que feliciten	26,3%

Comentari 7: Imparte de buena manera sus clases y exige un uso del lenguaje acorde a la situación, usando un registro formal. Respeta a los alumnos y quiere que no solo nuestro aprendizaje mejore sino nuestra educación y conocimientos generales que no son de la asignatura.

Comentari 8: Su exigencia ayuda a llevar la asignatura como se debe llevar

Comentari 6: -Proporciona ejercicios
-Gran conocimiento dela materia y la relaciona con aplicaciones en el mundo físico

Comentari 5: Se esfuerza en que realmente comprendamos, no quiere que grabemos hechos en nuestra cabeza son más

Comentari 4: Porque educa cómo se ha de hacer

Comentari 3: Deberia ser felicitado por su dominio de la materia.

Comentari 2: Es buen profesor, tiene sus cosas, pero sabe sobre la materia que imparte y se preocupa en intentar enseñar a pensar de manera crítica y dudar de las cosas.

Comentari 9: El señor Amaro es un poco criticado porque no usa dispositivos digitales y a veces es un poco duro, pero es un profesor que te dice las cosas a la cara como son, es un tio transparente, realista y enseña como un profesor deberia, con disciplina y orden, muy top.

Comentari 10: Se esfuerza para que entendamos la asignatura, incluso ofreciendo hacer clases extras

Comentari 1: Su labor por la docencia va mas allà de las clases ya que imparte charlas y clases auxiliares de forma totalmente altruista

Docencia realizada en la Universidad de Heidelberg

Universität Heidelberg

Zentrum für Astronomie

— Astronomisches Rechen-Institut —

Dr. R. Spurzem, Astronomisches Rechen-Institut, 69120 Heidelberg

apl.Prof.i.R. Dr. Rainer Spurzem[1]
Mönchhofstr 12 – 14
69120 Heidelberg, Germany
Tel: +49 (0)89 82080944
spurzem@ari.uni-heidelberg.de

Heidelberg, March 10, 2025

To whom it may concern,

this letter is to certify that Prof. Dr. Amaro Seoane taught the practical course 'Physics I' (belonging to the lecture 'Physics I' held by me) to the first year students of other faculties (e.g. biology, chemistry, mathematics) at the Ruprecht-Karls University of Heidelberg during the academic year 2001-2002 as a teaching researcher. The students were first-year students, so the subject was compulsory for them in order to obtain their official degree at the university. The evaluation of his teaching was 90%, the total amount of time 50 hours.

(Dr. Rainer Spurzem)

[1]apl. Prof. i.R. = retired extracurricular professor

Docencia realizada en la Universidad de Potsdam

Universität Potsdam · Am Neuen Palais 10 · 14469 Potsdam

Mathematisch-Naturwissenschaftliche Fakultät

Institut für Physik und Astronomie

Prof. Dr. Philipp Richter

Karl-Liebknecht-Str. 24/25
14476 Potsdam-Golm

Tel: +49 331 977 1841
Fax: +49 331 977 5935
prichter@astro.physik.uni-potsdam.de

Dr. habil. Pau Amaro-Seoane
Institut de Ciències de l'Espai (CSIC-IEEC)
Campus UAB
Carrer de Can Magrans s/n, 08193
Cerdanyola del Vallès (Barcelona)
Spain

Christchurch, den 18. März 2019

Confirmation of Teaching - Dr. habil. Pau Amaro-Seoane

This is to confirm that Dr. habil. Pau Amaro-Seoane has taught the following courses at the Institute for Physics and Astronomy of the University of Potsdam, Germany:

1) *„Stellar dynamics in galactic nuclei : the cosmic growth of black holes and gravitational waves“*

   Winter term 2013/2014, undergraduate Course ID: #89, 7x1.5=10.5 hours of teaching

2) *„Gravitational waves and astrophysics: A theoretical introduction“*

   Winter term 2014/2015, undergraduate Course ID: #83, 7x1.5=10.5 hours of teaching

Prof. Dr. Philipp Richter
Head of Studies, Astrophysics

CARDIFF UNIVERSITY
PRIFYSGOL CAERDYDD

DEPARTMENT OF PHYSICS AND ASTRONOMY

GRAVITY EXPLORATION INSTITUTE

PROFESSOR BERNARD SCHUTZ FRS MEMBNAS FLSW ML

SCHUTZBF@CARDIFF.AC.UK

19 May 2025

To whom it may concern:

I, Prof. Dr. Bernard F. Schutz – former Director at the Max Planck Institute for Gravitational Physics (Albert Einstein Institute – AEI) at Golm in Germany, Emeritus Professor of physics at Potsdam University, Germany, and currently Professor of Physics and Astronomy at Cardiff University, UK – hereby confirm that Prof. Dr. Pau Amaro Seoane taught mandatory astrophysics and astronomy courses in official doctoral education programs to students enrolled at Potsdam University during the following academic periods:

- April 1, 2005 – March 31, 2007
- October 1, 2008 – August 12, 2011
- August 13, 2011 – December 31, 2016

During each of these periods he held an appointment at the AEI in a position equivalent to that of an assistant professor for the purpose of teaching doctoral students under a cooperation agreement between Potsdam University and the AEI. Until my retirement in September 2014, these doctoral students were under my supervision as their official PhD supervisor (in my capacity as a Professor at the University of Potsdam), and they did their doctoral research at the AEI (in the Division of the AEI of which I was the Director). After my retirement and transition to Emeritus Director, my successor fulfilled these official responsibilities, with my continued engagement.

The courses covered advanced topics in theoretical astrophysics, including gravitational dynamics, compact objects, galactic nuclei, and relativistic astrophysics. Attendance at these courses was mandatory for doctoral students in our cooperation program, and each course carried credit equivalent to thirty hours of student workload (including lectures, exercises, and other assignments) per semester. Students engaged in theoretical and computational studies, with particular emphasis on black hole dynamics, stellar interactions, and gravitational wave sources.

The following courses were taught by Prof. Amaro Seoane as part of the required curriculum:

Course List:

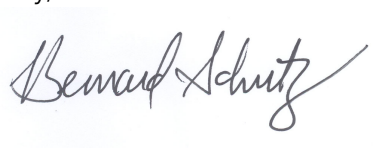
1. Stellar Dynamics and Galactic Nuclei
2. Introduction to Gravitational Wave Astrophysics

3. Relativistic Dynamics and Gravitational Wave Sources
4. An introduction to general relativity and gravitational waves
5. The formation and evolution of supermassive black hole binaries and their gravitational waves

All courses received consistently positive evaluations, with minimum satisfaction scores of 75% in each teaching assessment period. The complete chronological listing of when these courses were offered appears at the bottom of this letter. Added up over all the listed courses, the total teaching hours comes to 630 hours.

Should you require any additional information regarding Prof. Amaro Seoane's teaching activities during this period, please do not hesitate to contact me.

Yours sincerely,



Bernard Schutz FRS MembNAS FLSW ML
Professor, Gravity Exploration Institute, Cardiff University, Wales
Director (retired), Max Planck Institute for Gravitational Physics, Germany

Course Chronology:

April 1, 2005 – March 31, 2007
- Summer Semester 2005: Stellar Dynamics and Galactic Nuclei
- Winter Semester 2005/2006: Introduction to Gravitational Wave Astrophysics
- Summer Semester 2006: Relativistic Dynamics and Gravitational Wave Sources
- Winter Semester 2006/2007: An introduction to general relativity and gravitational waves

October 1, 2008 – August 12, 2011
- Winter Semester 2008/2009: The formation and evolution of supermassive black hole binaries and their GWs
- Summer Semester 2009: Stellar Dynamics and Galactic Nuclei

- Winter Semester 2009/2010: Introduction to Gravitational Wave Astrophysics

- Summer Semester 2010: Relativistic Dynamics and Gravitational Wave Sources

- Winter Semester 2010/2011: An introduction to general relativity and gravitational waves

- Summer Semester 2011: The formation and evolution of supermassive black hole binaries and their GWs

August 13, 2011 – December 31, 2016

- Winter Semester 2011/2012: Stellar Dynamics and Galactic Nuclei

- Summer Semester 2012: Introduction to Gravitational Wave Astrophysics

- Winter Semester 2012/2013: Relativistic Dynamics and Gravitational Wave Sources

- Summer Semester 2013: An introduction to general relativity and gravitational waves

- Winter Semester 2013/2014: The formation and evolution of supermassive black hole binaries and their GWs

- Summer Semester 2014: Stellar Dynamics and Galactic Nuclei

- Winter Semester 2014/2015: Introduction to Gravitational Wave Astrophysics

- Summer Semester 2015: Relativistic Dynamics and Gravitational Wave Sources

- Winter Semester 2015/2016: An introduction to general relativity and gravitational waves

- Summer Semester 2016: The formation and evolution of supermassive black hole binaries and their GWs

- Winter Semester 2016: Stellar Dynamics and Galactic Nuclei

Docencia realizada en la Universidad de Lanzhou

兰州大学物理科学与技术学院

To whom it may concern,

This letter gives proof and evidence of the teaching that Prof. Amaro has carried out at our university during the last years.

In my role as the Dean of the School of Physical Sciences and Technology at Lanzhou University, one of my responsibilities is to oversee and facilitate courses of this nature. Specifically, I am tasked with orchestrating the inclusion of courses delivered by internationally renowned guest lecturers. This involves the coordination of the entire teaching plan and ensuring its official recognition within the academic framework.

As the Dean, I play a role in identifying and inviting distinguished guest lecturers from abroad. These guest lecturers bring their expertise and international perspective to enrich our educational offerings to our students. Additionally, I work closely with the faculty to integrate these specialized courses into our curriculum.

My duty encompasses not only selecting guest lecturers but also ensuring that the teaching plans align with our academic standards and goals. Once these plans are thoroughly reviewed and approved, they become an integral part of our official course catalog. Our University is devoted to both teaching and research. These are our most general objectives, and Prof. Dr. Amaro has been an asset for us in these two points.

It should be noted that each hour of teaching, whether theory, practice or research (we call it practical teaching, it could be the presentation of a research paper with Q&A), was part of the official programme mentioned at each point, and was a prerequisite. Each of the points was associated with formal credits in order obtaining the corresponding certificate.

Courses delivered online formally and officially counted as face-to-face teaching, i.e. they consisted of all the normal and customary formalities of a face-to-face course, and each hour contributed in the form of teaching credits for the students.

The summer courses at our university count as regulated teaching, as they are associated with credits, so the teaching given by Mr Amaro during the summer courses is just as valid as the teaching that took place during the other seasons of the year. We make no distinction in this respect.

I include detailed information about the type of linkage Prof. Amaro has made, as well as the students' evaluation of his teaching, the number of hours he devoted to each course, the breakdown of the subject itself by number of hours, and the title of the course. We have tried to follow as closely as possible the indications given by Prof. Amaro but should you have any question, please contact us. I also include information on the type of students. The courses have been separated by academic year. Please note that some years included two courses.

During the teaching courses that Prof. Dr. Amaro imparted at our University, a formal contract was drawn up between the university and Mr.Amaro. In return for covering his travel and hotel expenses. In exchange, Mr. Amaro gave the courses mentioned in this letter. For the online courses, the contract stipulated that the remuneration would be reserved for future visits by the lecturer, so that

his accommodation and air tickets would be covered by our university in exchange for his teaching.

In total, Prof. Amaro has taught 740 hours at our university, and the students' evaluation of his teaching has always been exceptional.

Academic year ("curso academico"): 2017-2018.

Type of linkage ("tipo de vinculacion"): Visiting professor ("professor invitado").

Breakdown by type of teaching ("desglose por tipo de docencia"): bachelor degree in physical science ("grado en ciencias fisicas").

Institution ("institucion"): Lanzhou University.

Amount of teaching hours: 120 hours

Official program ("programa oficial"):

In the undergraduate physics programme, Professor Amaro Seoane taught this course, dedicating a total of 120 hours. Out of these, 102 hours were devoted to comprehensive theoretical instruction. The remaining 18 hours were judiciously reserved for engaging and instructive exercises, enabling students to apply their new-found knowledge practically. Notably, the students expressed their satisfaction with Professor Seoane's teaching skills and provided very good feedback. They gave him a rating of 8.2 out of 10, the highest possible score.

Course: An Introduction to Gravitational Waves from the Perspective of Astronomy

Duration: 120 hours
Theoretical Classes (102 hours):
Module 1: Introduction to Gravitational Waves (12 hours)

- Historical Background and Significance (4 hours)
- Basics of Gravitational Wave Theory (8 hours)

Module 2: Gravitational Wave Detection Techniques (20 hours)

- Interferometry and Laser Interferometers (8 hours)
- Resonant Mass Detectors and Pulsar Timing Arrays (6 hours)
- Upcoming Technologies and Space-Based Observations (6 hours)

Module 3: Observations of Gravitational Wave Events (24 hours)

- LIGO/Virgo and Their Groundbreaking Discoveries (10 hours)
- Multi-Messenger Astronomy and Neutron Star Mergers (8 hours)

Black Hole Binary Inspirals and Their Implications (6 hours)

Module 4: Advanced Topics in Gravitational Wave Astronomy (24 hours)

Gravitational Wave Data Analysis (8 hours)
Understanding the Data: Parameter Estimation (8 hours)
Exotic Sources: Cosmic Strings, Superradiance, and More (8 hours)

Module 5: Interpretation and Implications (22 hours)

Gravitational Waves as Probes of Extreme Physics (10 hours)
Testing General Relativity and Alternative Theories (6 hours)
Gravitational Waves in Cosmology and the Early Universe (6 hours)

Exercises (18 hours):
Exercise Set 1: Basics of Gravitational Waves (6 hours)

Calculating Waveforms and Amplitudes (3 hours)
Understanding the Wave Equation (3 hours)

Exercise Set 2: Gravitational Wave Detection (6 hours)

Analyzing Interferometer Data (3 hours)
Simulating Pulsar Timing Arrays (3 hours)

Exercise Set 3: Data Analysis and Interpretation (6 hours)

Parameter Estimation and Signal Processing (3 hours)
Analyzing Observed Gravitational Wave Events (3 hours)

Final Review and Assessment (12 hours):
Comprehensive Review (10 hours)

Recap of Key Concepts and Significant Discoveries (8 hours)
Addressing Questions and Clarifications (2 hours)

Final Assessment (2 hours)

Comprehensive Examination Covering Course Material (2 hours)

Academic year (“curso academico”): 2018-2019.

Type of linkage ("tipo de vinculacion"): Visiting professor ("professor invitado").

Breakdown by type of teaching ("desglose por tipo de docencia"): bachelor degree in physical science ("grado en ciencias fisicas").

兰州大学物理科学与技术学院

Institution ("institucion"): Lanzhou University.

Amount of teaching hours: 150 hours

Official program ("programa oficial"):

Within the physics undergraduate program, Professor Amaro Seoane taught the course, dedicating a total of 150 hours of which 120 hours were allocated to theoretical instruction. The remaining 30 hours were reserved for problem-solving sessions, allowing students to apply their newfound knowledge in practical scenarios. Professor Amaro's teaching prowess garnered accolades from students who expressed their profound appreciation for the course, awarding him a commendable rating of 9.1 out of 10, the highest attainable score.

Course: Introduction to Astrophysics

Duration: 150 hours
Theoretical Classes (120 hours):
Module 1: Introduction to Astrophysics (12 hours)

Overview of Astrophysics and Its Significance (4 hours)
Historical Developments and Key Concepts (8 hours)

Module 2: Celestial Mechanics and Orbits (18 hours)

Kepler's Laws and Planetary Motion (6 hours)
Newtonian Gravitation and Celestial Orbits (6 hours)
Two-Body and Three-Body Problems (6 hours)

Module 3: Stellar Structure and Evolution (24 hours)

Properties and Classification of Stars (8 hours)
Stellar Formation and Life Cycle (8 hours)
Stellar Evolution and Nucleosynthesis (8 hours)

Module 4: Galaxies and Cosmology (18 hours)

Types and Properties of Galaxies (6 hours)
The Expanding Universe and Cosmological Models (6 hours)
Cosmic Microwave Background and Dark Matter (6 hours)

Module 5: High-Energy Astrophysics (18 hours)

Black Holes and Neutron Stars (6 hours)
Active Galactic Nuclei and Quasars (6 hours)
Supernovae and Gamma-Ray Bursts (6 hours)

Module 6: Exoplanets and Astrobiology (12 hours)

Detection and Characterization of Exoplanets (4 hours)
The Search for Extraterrestrial Life (4 hours)
Habitability and Exoplanetary Environments (4 hours)

Problem-Solving Sessions (30 hours):
Problem Set 1: Celestial Mechanics and Orbits (6 hours)

Applying Kepler's Laws (2 hours)
Celestial Orbits and Gravitational Interactions (4 hours)

Problem Set 2: Stellar Structure and Evolution (6 hours)

Calculating Stellar Properties (2 hours)
Stellar Evolutionary Tracks (4 hours)

Problem Set 3: Galaxies and Cosmology (6 hours)

Analyzing Galaxy Properties (2 hours)
Cosmological Models and Parameters (4 hours)

Problem Set 4: High-Energy Astrophysics (6 hours)

Properties of Black Holes and Neutron Stars (2 hours)
Active Galactic Nuclei and Their Emission (4 hours)

Problem Set 5: Exoplanets and Astrobiology (6 hours)

Exoplanet Detection Methods (2 hours)
Habitability and Astrobiological Concepts (4 hours)

Final Review and Assessment (5 hours):
Comprehensive Review (3 hours)

Recap of Key Concepts and Significant Discoveries (2 hours)
Addressing Questions and Clarifications (1 hour)

Final Assessment (2 hours)

Comprehensive Examination Covering Course Material (2 hours)

Academic year ("curso academico"): 2019-2020.

Type of linkage ("tipo de vinculacion"): Visiting professor ("professor invitado").

Breakdown by type of teaching ("desglose por tipo de docencia"): bachelor degree in physical science ("grado en ciencias fisicas").

Institution ("institucion"): Lanzhou University.

Amount of teaching hours: 60 hours

Official program ("programa oficial"):

During the bachelor degree program in physics, Professor Amaro Seoane conducted the course "Gravitational-Wave Astrophysics." Throughout the course, Professor Seoane devoted a total of 60 hours, with 40 hours dedicated to theoretical instruction and 20 hours allocated for a research project. The students' feedback on Professor Amaro Seoane's teaching was exceptional, reflecting their high praise and appreciation for the course. They marked him with 9.3 out of 10 (max score).

Course Title: Gravitational-Wave Astrophysics
Duration: 60 hours

Theoretical Classes (40 hours):

1. Introduction to Gravitational Waves (4 hours)
   - Overview of general relativity and gravitational wave generation
   - Detection methods and historical milestones

2. Sources of Gravitational Waves (8 hours)
   - Binary black hole mergers and gravitational wave signals
   - Neutron star mergers and associated phenomena

3. Gravitational Wave Detectors (6 hours)
   - LIGO and Virgo: Principles of operation and sensitivity
   - Future detectors and space-based observatories

4. Data Analysis and Signal Processing (8 hours)
   - Data analysis techniques for extracting signals from noise
   - Bayesian analysis and parameter estimation

5. Astrophysical Implications of Gravitational Waves (6 hours)
   - Multi-messenger astronomy and joint observations
   - Gravitational wave cosmology and measuring the Hubble constant

6. Black Hole Astrophysics (4 hours)
   - Properties and characteristics of black holes
   - Supermassive black holes and their role in galaxy evolution

7. Neutron Stars and Compact Objects (4 hours)
   - Neutron star properties and equation of state

- White dwarfs and their relevance to gravitational wave astronomy

8. Gravitational Waves and Fundamental Physics (4 hours)
   - Testing general relativity with gravitational waves
   - Gravitational wave backgrounds and primordial signals

Research Project (20 hours):

1. Research Proposal and Topic Selection (4 hours)
   - Students select a research topic related to gravitational-wave astrophysics

2. Literature Review and Data Collection (6 hours)
   - Students conduct a literature review and collect relevant data

3. Data Analysis and Interpretation (6 hours)
   - Students analyze the data and interpret their findings

4. Research Presentation (4 hours)
   - Students present their research findings to the class

Review and Final Examination (5 hours):

1. Comprehensive Review (4 hours)
   - Recap of key concepts and important discoveries

2. Final Examination (1 hour)
   - Examination covering the entire course

Academic year ("curso academico"): 2019-2020.

Type of linkage ("tipo de vinculacion"): Visiting professor ("professor invitado").

Breakdown by type of teaching ("desglose por tipo de docencia"): master's degree in theoretical phsysics ("master en fisica teorica").

Institution ("institucion"): Lanzhou University.

Amount of teaching hours: 70 hours

Official program ("programa oficial"):

In the academic year, Professor Amaro Seoane delivered the course titled "An Introduction to Conformal Diagrams and the Interior of Black Holes" as part of our master's degree program in

physics. Throughout the course, Professor Seoane dedicated a total of 70 hours, focusing entirely on theoretical instruction. The students' feedback on Professor Amaro Seoane's teaching was exceptional, reflecting their high admiration and satisfaction with the course. We ask them to grade the professors' teaching; in this occasion, Prof. Amaro obtained a 9.1 out of 10.

Course Title: An Introduction to Conformal Diagrams and the Interior of Black Holes
Duration: 70 hours

1. Introduction to Conformal Diagrams (6 hours)
   - Overview of conformal transformations in spacetime
   - Purpose and utility of conformal diagrams in general relativity

2. Minkowski Spacetime and Flat Conformal Diagrams (8 hours)
   - Understanding Minkowski spacetime and its flat conformal diagram
   - Light cones, causal structure, and the role of null infinity

3. Schwarzschild Black Hole and Kruskal-Szekeres Coordinates (10 hours)
   - Introduction to Schwarzschild black holes and their properties
   - Transformation to Kruskal-Szekeres coordinates and their advantages

4. Conformal Diagrams of Schwarzschild Black Holes (8 hours)
   - Building conformal diagrams for maximally-extended Schwarzschild black holes
   - Geodesics and paths of particles in the black hole interior

5. Rotating Black Holes and Kerr Coordinates (10 hours)
   - Kerr black holes: Properties and rotating spacetime
   - Transformation to Kerr coordinates and their significance

6. Conformal Diagrams of Kerr Black Holes (10 hours)
   - Constructing conformal diagrams for rotating black holes
   - Ergosphere, event horizon, and the singularity structure

7. Interior of Black Holes (6 hours)
   - Curvature singularities and the nature of black hole interiors
   - Black hole evaporation and information paradox

8. Advanced Topics and Cosmological Black Holes (6 hours)
   - Introduction to cosmological black holes and their relevance
   - Advanced topics in conformal diagrams and exotic black hole solutions

9. Applications and Contemporary Research (6 hours)
   - Applications of conformal diagrams in theoretical physics
   - Overview of current research in black hole interior and related fields

Review and Final Assessment (3 hours):

1. Comprehensive Review (3 hours)
   - Recap of key concepts and important discoveries in the course

2. Final Assessment (Written examination)
   - Comprehensive evaluation of students' understanding of the course material

Prof. Amaro Seoane was as kind as to make a summary of the most important points of the lectures and to upload them to youtube.

Academic year : 2019-2020 - Second course

Type of linkage ("tipo de vinculacion"): Visiting professor ("professor invitado").

Breakdown by type of teaching ("desglose por tipo de docencia"): bachelor's degree in physical sciences ("grado en ciencias fisicas").

Institution ("institucion"): Lanzhou University.

Amount of teaching hours: 70 hours

Official program ("programa oficial"):

During the academic year, Professor Amaro Seoane conducted the course "Mathematical Analysis I" as part of our bachelor's degree program in physics. Throughout the course, Professor Seoane dedicated a total of 70 hours to the subject, with 50 hours allocated to theoretical instruction and 20 hours devoted to exercises. The students' feedback on Professor Amaro Seoane's teaching was outstanding, with the report indicating their high praise and satisfaction with the course. He obtained a score of 9.2 out of 10 from the students for his teaching.

Course Title: Mathematical Analysis I
Duration: 70 hours

Theory Classes (50 hours):

1. Introduction to Real Numbers and Sets (4 hours)
   - The real number system: Properties and completeness
   - Sets, subsets, and set operations

2. Limits and Continuity (8 hours)
   - Definition of limits and basic limit properties
   - One-sided limits and continuity of functions

3. Differentiation (12 hours)
   - Definition of derivatives and the differentiation rules
   - Derivatives of trigonometric, exponential, and logarithmic functions

4. Applications of Differentiation (8 hours)
   - Tangents and normals
   - Maxima, minima, and optimization problems

5. Integration (10 hours)
   - Definite and indefinite integrals
   - Integration techniques and applications

6. Transcendental Functions (8 hours)
   - Properties and graphs of trigonometric, exponential, and logarithmic functions
   - Inverse trigonometric and hyperbolic functions

7. Sequences and Series (6 hours)
   - Convergent and divergent sequences
   - Series, tests for convergence, and power series

8. Introduction to Multivariable Calculus (4 hours)
   - Functions of several variables and partial derivatives
   - Double and triple integrals

Exercises (20 hours):

1. Limit and Continuity Practice (5 hours)
   - Solving limit problems and analyzing continuity

2. Differentiation Practice (5 hours)
   - Calculating derivatives of various functions

3. Applications of Differentiation (5 hours)
   - Solving real-world optimization problems using derivatives

4. Integration Practice (5 hours)
   - Evaluating definite and indefinite integrals

Review and Final Assessment (3 hours):

1. Comprehensive Review (2 hours)
   - Recap of key concepts and important results in the course

2. Final Assessment (Written examination) (1 hour)
   - Comprehensive evaluation of students' understanding of the course material

Academic year ("curso academico"): 2021-2022.

Type of linkage ("tipo de vinculacion"): Visiting professor ("professor invitado").

4. Applications of Differentiation (8 hours)
   - Tangents and normals
   - Maxima, minima, and optimization problems

5. Integration (10 hours)
   - Definite and indefinite integrals
   - Integration techniques and applications

6. Transcendental Functions (8 hours)
   - Properties and graphs of trigonometric, exponential, and logarithmic functions
   - Inverse trigonometric and hyperbolic functions

7. Sequences and Series (6 hours)
   - Convergent and divergent sequences
   - Series, tests for convergence, and power series

8. Introduction to Multivariable Calculus (4 hours)
   - Functions of several variables and partial derivatives
   - Double and triple integrals

Exercises (20 hours):

1. Limit and Continuity Practice (5 hours)
   - Solving limit problems and analyzing continuity

2. Differentiation Practice (5 hours)
   - Calculating derivatives of various functions

3. Applications of Differentiation (5 hours)
   - Solving real-world optimization problems using derivatives

4. Integration Practice (5 hours)
   - Evaluating definite and indefinite integrals

Review and Final Assessment (3 hours):

1. Comprehensive Review (2 hours)
   - Recap of key concepts and important results in the course

2. Final Assessment (Written examination) (1 hour)
   - Comprehensive evaluation of students' understanding of the course material

Academic year ("curso academico"): 2021-2022.

Type of linkage ("tipo de vinculacion"): Visiting professor ("professor invitado").

- Symmetry operations and conservation laws

8. Time-Independent Perturbation Theory (5 hours)
   - Non-degenerate and degenerate perturbation theory
   - Applications to fine structure and Zeeman effect

Exercises (27 hours):

1. Wave Function and Probability (6 hours)
   - Calculating probabilities and normalization of wave functions

2. Operators and Observables (6 hours)
   - Working with operators and calculating expectation values

3. One-Dimensional Potentials (6 hours)
   - Solving problems related to particle in a box and harmonic oscillator

4. Angular Momentum and Spin (6 hours)
   - Calculating angular momentum operators and their eigenvalues

3. Quantum Mechanics in Three Dimensions (3 hours)
   - Solving problems related to central potentials and angular momentum

Review and Final Assessment (3 hours):

1. Comprehensive Review (2 hours)
   - Recap of key concepts and important results in the course

2. Final Assessment (Written examination) (1 hour)
   - Comprehensive evaluation of students' understanding of the course material

Academic year ("curso academico"): 2022-2023.

Type of linkage ("tipo de vinculacion"): Visiting professor ("professor invitado").

Breakdown by type of teaching ("desglose por tipo de docencia"): master's degree in theoretical physics ("master en fisica teorica").

Institution ("institucion"): Lanzhou University.

Amount of teaching hours: 90 hours

Official program ("programa oficial"):

In this academic year, Professor Amaro Seoane delivered online the course titled "Introduction to Geometry and Differential Topology" as part of our master's

degree program in physics. Because of his teaching duties in his home country, the course was entirely online.

Throughout the course, Professor Seoane dedicated a total of 90 hours to the subject, with 72 hours allocated to theory and 18 hours to exercises. The students' feedback on Professor Amaro Seoane's teaching was exceptional, reflecting their high satisfaction with the course. He obtained a 9.7 out of 10 for his teaching from the students.

Course Title: Introduction to Geometry and Differential Topology
Duration: 90 hours

Theory (80% - 72 hours):

1. Introduction to Geometry (8 hours)
   - Overview of geometry and its historical development
   - Basic concepts of Euclidean geometry and non-Euclidean geometries

2. Euclidean Geometry (12 hours)
   - Properties of Euclidean space and geometric objects
   - Lines, angles, triangles, and circles in Euclidean geometry

3. Curves and Surfaces (10 hours)
   - Curvature, torsion, and Frenet-Serret formulas for curves
   - Parametric surfaces and their properties

4. Differential Manifolds (10 hours)
   - Introduction to differential manifolds and their representation
   - Tangent spaces, vector fields, and differential forms on manifolds

5. Vector Bundles and Fiber Bundles (8 hours)
   - Vector bundles and their importance in differential geometry
   - Fiber bundles and their application to topology and geometry

6. Riemannian Geometry (12 hours)
   - Riemannian metrics and geodesics on manifolds
   - Curvature tensors and the Riemann curvature tensor

7. Topology and Differential Topology (12 hours)
   - Basic concepts of point-set topology
   - Differential topology and its relation to smooth structures on manifolds

8. Morse Theory (10 hours)
   - Critical points and index of critical points
   - Morse inequalities and their applications

Problem-Solving Sessions (20% - 18 hours):

1. Geometric Problem Solving (6 hours)
   - Problem-solving exercises related to Euclidean geometry and geometric objects

2. Curves and Surfaces Problem Solving (6 hours)
   - Solving problems involving curves, surfaces, and their properties

3. Differential Geometry Problem Solving (6 hours)
   - Problem-solving exercises on differential manifolds and Riemannian geometry

4. Differential Topology Problem Solving (6 hours)
   - Problem-solving sessions related to differential topology and Morse theory

Academic year ("curso academico"): 2022-2023

Type of linkage ("tipo de vinculacion"): Visiting professor ("professor invitado").

Breakdown by type of teaching ("desglose por tipo de docencia"): master's degree in theoretical physics ("master en fisica teorica").

Institution ("institucion"): Lanzhou University.

Official program ("programa oficial"):

As a summer course, Professor Amaro taught an online course for our master students which was very well visited. We expected a low number of students because of the holidays but instead we got a large participation. He taught "An intuitive introduction to the science of gravitational waves from a standpoint of astrophysics and relativity". The course was divided in 80% of theory, 10% problem-solving and 10% for a paper presentation from a prepared list of papers. Prof. Amaro obtained a qualification of 9.5 from the students, who have asked him to extend the lectures after summer. As explained in the cover letter, this course was as valid in terms of credits as any other one.

Course Title: An Intuitive Introduction to the Science of Gravitational Waves from a Standpoint of Astrophysics and Relativity
Duration: 100 hours

Theoretical Classes (80 hours):

1: Introduction to Gravitational Waves (10 hours)
- Overview of Gravitational Waves and Their Significance (4 hours)
- Basics of General Relativity and Curved Spacetime (6 hours)

2: Generation of Gravitational Waves (12 hours)
- Sources of Gravitational Waves: Binary Systems, Supernovae, Neutron Star mountains and other exotic sources. (6 hours)
- Waveforms and Polarizations of Gravitational Waves (6 hours)

3: Detection of Gravitational Waves (14 hours)
- Interferometer Principle and Laser Interferometry (6 hours)
- LIGO and Virgo Observatories: Design and Operation (6 hours)
- Space-borne Gravitational Wave Detectors (2 hours)

4: Astrophysical Implications (14 hours)
- Gravitational Waves from Binary Black Hole and Neutron Star Mergers (8 hours)
- Multi-Messenger Astronomy and Joint Observations (6 hours)

5: Black Holes, Neutron Stars, and Compact Objects (10 hours)
- Properties of Black Holes and Neutron Stars (6 hours)
- Compact Binaries and Gravitational Wave Signatures (4 hours)

6: Cosmology and Big Bang Relics (10 hours)
- Gravitational Waves from Cosmic Inflation (4 hours)
- Primordial Gravitational Waves and the CMB (6 hours)

Problem-Solving Sessions (10 hours):

Problem Set 1: Concepts in General Relativity (4 hours)
- Solving Problems Related to Curved Spacetime (2 hours)
- Understanding Geodesics and Curvature (2 hours)

Problem Set 2: Waveforms and Polarizations (3 hours)
- Calculating Gravitational Wave Polarizations (1.5 hours)
- Analyzing Waveforms from Different Sources (1.5 hours)

Problem Set 3: Detection and Interferometry (3 hours)
- Exploring Interferometer Principles and Laser Interferometry (1.5 hours)
- Understanding Detector Noise and Signal Extraction (1.5 hours)

Paper Presentations (10 hours):

Discussions with the Professor (4 hours)
- Engaging One-on-One and Group Discussions with the Professor (2 hours)
- Addressing Students' Questions and Clarifications (2 hours)

Scientific Presentation Tutorial (4 hours)
- Practical Tips and Techniques for Effective Scientific Presentations (2 hours)
- Step-by-Step Guide to Crafting Clear and Presentation Slides (2 hours)

Paper Presentations (2 hours)
- Students Deliver Presentations on Selected Papers (2 hours)

Review and Final Assessment (5 hours):

Comprehensive Review (3 hours)
- Summarizing Key Concepts and Insights (2 hours)
- Addressing Questions and Clarifications (1 hour)

Final Assessment (2 hours)
- Comprehensive Examination Covering Course Material (2 hours)

杨捷

The school of physical sciences and technology Lanzhou Univesity
22, Nov, 2023

Docencia realizada en la Peking University, China

Kavli Institute for Astronomy and Astrophysics
Peking University
北京大学科维理天文与天体物理研究所

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17 Mar, 2025

To Whom It May Concern,

This letter serves to confirm that Prof. Dr. Amaro Seoane taught the course "Introduction to Gravitational Waves" at Peking University (PKU) in Beijing, China, during the 2021-2022 academic year. The academic year at PKU is divided into two semesters: the Fall Semester, which runs from September to January, and the Spring Semester, which runs from February to June. Prof. Dr. Amaro Seoane's course spanned both semesters, beginning in September 2021 and concluding in May 2022, thereby constituting a full academic year course.

During his stay at PKU, Prof. Dr. Amaro Seoane held the position of Visiting Professor and was fully integrated into the academic activities of the Department of Astrophysics. His course was designed for students enrolled in the Master's Program in Astrophysics and was a compulsory component of their curriculum.

The course comprised a total of 100 teaching hours, distributed across lectures, problem-solving sessions, and student assessments. Below is a brief syllabus outlining the course content and the distribution of teaching hours:

Course Syllabus: Introduction to Gravitational Waves

Introduction to General Relativity and Gravitational Waves (10 hours)

Historical context and theoretical foundations.

Linearized gravity and the wave equation.

Sources of Gravitational Waves (20 hours)

Compact binary systems: black holes and neutron stars.

Supernovae, cosmic strings, and stochastic backgrounds.

Detection of Gravitational Waves (20 hours)

Ground-based detectors: LIGO, Virgo, and KAGRA.

Space-based detectors: LISA and future missions.

Data analysis techniques and signal processing.

Astrophysical and Cosmological Implications (20 hours)

Probing black hole mergers and neutron star collisions.

Gravitational waves as probes of the early universe.

Hands-on Problem Solving and Computational Exercises (20 hours)

Numerical simulations of gravitational wave sources.

Data interpretation and visualization.

Student Presentations and Final Assessment (10 hours)

Student-led discussions on recent research papers.

Written examination and project submissions.

The course was structured to provide students with a comprehensive understanding of gravitational wave physics, from theoretical foundations to cutting-edge applications in astrophysics. Prof. Dr. Amaro Seoane employed a combination of lectures, interactive problem-solving sessions, and computational exercises to ensure a robust learning experience.

At the conclusion of the course, students evaluated Prof. Dr. Amaro Seoane's teaching performance. He achieved an 87% satisfaction rate in the student evaluations, reflecting his dedication, expertise, and ability to engage students effectively.

As a Visiting Professor, Prof. Dr. Amaro Seoane made significant contributions to our

program, enriching the academic environment with his extensive knowledge and research experience. We highly commend him for his commitment to delivering high-quality education and for his active participation in the academic life of our university.

Should you require further information, please do not hesitate to contact us.

Sincerely,

Xian Chen

Docencia realizada en la Universidad de La Sapienza, Roma

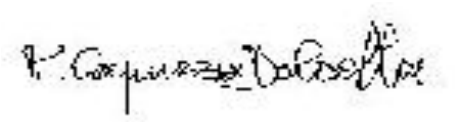
DIPARTIMENTO DI FISICA
SAPIENZA
UNIVERSITÀ DI ROMA

Roma, March, 9, 2019

I am here to certify that dr. Pau Amaro Seoane has given in the month of May 2018 a full course for our PhD program in Astronomy, Astrophysics and Space Science. He fruited of a financial contribution by our university and an invitation as visiting professor for didactics.
The title of the course was "An introduction to gravitational-wave physics and astrophysics.

The course consisted of 20 hours of lectures and additional hours of discussion with students about development of possible projects related to the topics of the course.

Warm regards, sincerely



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