



ΑΡΙΣΤΟΤΕΛΕΙΟ  
ΠΑΝΕΠΙΣΤΗΜΙΟ  
ΘΕΣΣΑΛΟΝΙΚΗΣ

# ΣΕΜΙΝΑΡΙΟ ΠΜΣ ΥΠΟΛΟΓΙΣΤΙΚΗΣ ΦΥΣΙΚΗΣ ΤΜΗΜΑ ΦΥΣΙΚΗΣ

Τετάρτη 7 Ιουνίου 2023

ώρα 11:15

Zoom link: [authgr.zoom.us/j/93408351002](https://authgr.zoom.us/j/93408351002)

## Σεμινάρια ΠΜΣ Υπολογιστικής Φυσικής 2022-2023

**ΥΠΟΛΟΓΙΣΤΙΚΗ ΔΥΝΑΜΙΚΗ,  
ΑΣΤΡΟΔΥΝΑΜΙΚΗ & ΧΑΟΣ**

Φρακταλικοί δομές & Χάος  
Παράδειγμα κλαστικής  
Μελέτη του προφίλιματος των 3 σφαιρών

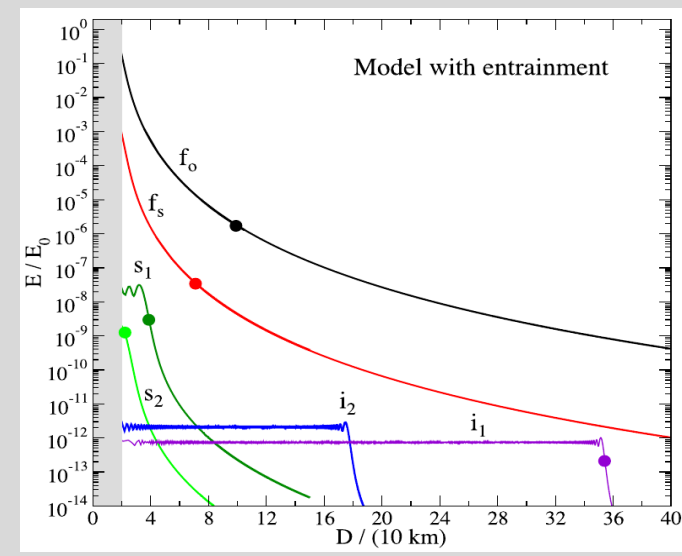
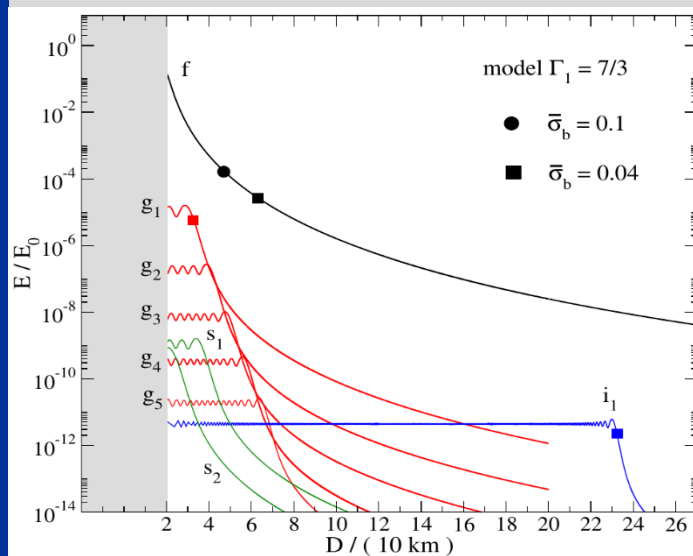
**ΥΠΟΛΟΓΙΣΤΙΚΗ ΒΙΟΦΥΣΙΚΗ**

Μελέτη της ροής & δομής του αγγειακού δικτύου  
Βιοσυστασιακή & θερμική ανάλυση ανθρώπινων οργάνων  
Ειδικός αριθμός απορρόφησης (SAR)  
Προσομοίωση δόσεων ακτινών με τη μέθοδο Monte Carlo

**ΠΥΡΗΝΙΚΗ ΦΥΣΙΚΗ & ΣΤΟΙΧΕΙΩΔΗ ΣΩΜΑΤΙΑ**

Υ-ROOT  
Εκπαίδευση ROOT (object-oriented program and library developed by CERN)  
Μακροσκοπικά & μικροσκοπικά τεχνικά μοντέλα  
Στοιχειώδη σωματίδια & κοσμική ακτινοβολία

## Inferring the dense nuclear matter equation of state with neutron star tides



**Dr. Pantelis Pnigouras**  
Postdoctoral Researcher Department of Applied Physics,  
University of Alicante, Spain

During the late stages of a neutron star binary inspiral finite-size effects come into play, with the tidal deformability of the supranuclear density matter leaving an imprint on the gravitational-wave signal. As demonstrated in the case of GW170817—the first direct detection of gravitational waves from a neutron star binary—this can lead to strong constraints on the neutron star equation of state.

We are going to discuss the contribution of dynamical tidal effects, such as oscillation mode resonances triggered by the orbital motion, to the neutron star tidal deformability. We will show how the matter composition is encoded in the dynamical tidal response, as well as the influence of more realistic elements of neutron star physics, e.g., the presence of an elastic crust, superfluidity, and rotation.

In addition, we will discuss a newly-discovered tidal secular instability, driven by the emission of gravitational waves. This instability is active as long as the stellar spin is larger than the binary orbital frequency and, as opposed to the tide itself, it decelerates the inspiral.

Το προφίλ του ομιλητή



Pantelis Pnigouras is a Greek theoretical astrophysicist, currently a postdoctoral fellow at the Department of Applied Physics of the University of Alicante. He completed his undergraduate studies at the Physics Department of the Aristotle University of Thessaloniki, and obtained his Master's and Ph.D. degrees in Physics at the Physics Department of the University of Tübingen, Germany. He has been previously appointed as a postdoctoral fellow at the University of Southampton, UK, at the Sapienza University of Rome, Italy, and at the Aristotle University of Thessaloniki. His research interests are centered around gravitational-wave emission from isolated and binary neutron stars, with a particular focus on neutron star seismology and the development of techniques that can be used to infer the dense nuclear matter equation of state.