



ΑΡΙΣΤΟΤΕΛΕΙΟ
ΠΑΝΕΠΙΣΤΗΜΙΟ
ΘΕΣΣΑΛΟΝΙΚΗΣ

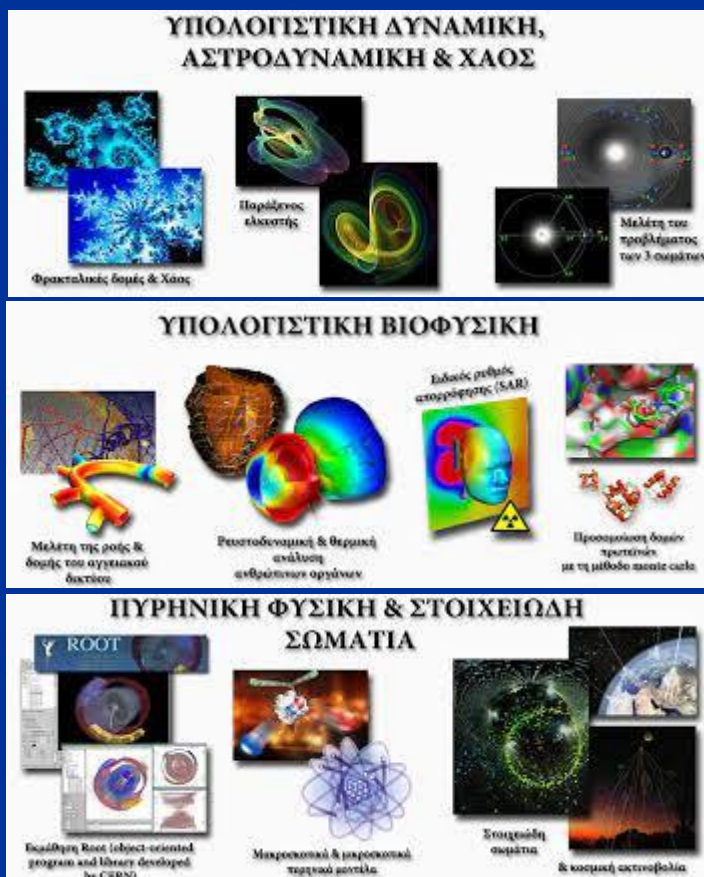
ΣΕΜΙΝΑΡΙΟ ΠΜΣ ΥΠΟΛΟΓΙΣΤΙΚΗΣ ΦΥΣΙΚΗΣ ΤΜΗΜΑ ΦΥΣΙΚΗΣ

Πέμπτη 6 Απριλίου 2023

Αίθουσα συνεδριάσεων τμήματος Φυσικής (4^{ος} όροφος,
αίθουσα 26)

ώρα 11:00

Σεμινάρια ΠΜΣ Υπολογιστικής Φυσικής 2022-2023



Identifying astrophysical black holes with the help of orbital spies: the redshift



Alfredo Herrera-Aguilar

Instituto de Fisica, Benemerita Universidad Autonoma de Puebla, Mexico

We present a general relativistic method that allows one to analytically express the mass and spin parameters of the Kerr black hole in terms of observational data: the total redshift and blueshift of photons emitted by geodesic massive particles revolving the black hole and their orbital parameters. Thus, we present closed formulas for the mass and spin parameters of the Kerr black hole in terms of few directly observed quantities in the case of equatorial circular orbits either when the black hole is static or is moving with respect to a distant observer. These formulas allow one to compute the Kerr black hole parameters by applying this general relativistic formalism to astrophysical systems like megamaser accretion disks orbiting supermassive black holes at the core of active galactic nuclei. Our results open a new window to implement parameter estimation studies to constrain black hole variables, and they can be generalized to black hole solutions beyond Einstein gravity.

Το προφίλ του ομιλητή



Dr. Alfredo Herrera-Aguilar received his PhD from the Bogolyubov Laboratory for Theoretical Physics, Joint Institute for Nuclear Research, Dubna, Russia, in 1999 and performed a postdoctoral stay at the Physics Department, Aristotle University of Thessaloniki, Greece, from 2003 to 2005. He is interested in developing general relativistic methods to compute or estimate astrophysical black hole parameters as well as in elucidating relativistic effects in astrophysical systems.

He also is constructing new black hole solutions with Lifshitz and Schroedinger symmetries with the aim of applying them to describe condensed matter systems within the framework of the holographic gauge-gravity correspondence. He has collaborated in 68 research articles published in international journals and has directed a total of 33 theses (17 undergraduate, 10 master's and 6 doctoral). From 1999 to 2015 he worked at the Institute of Physics and Mathematics of the Universidad Michoacana de San Nicolás de Hidalgo and served as its director from 2006 to 2010. Since 2015 he has been a Senior Research Professor at the Institute of Physics of the Benemerita Universidad Autonoma de Puebla, in Mexico.