



复旦大学物理系 Colloquium

Time: 14:00, Tuesday, 2023.3.21

Location: C108, Jiangwan Physics Building (线下报告)

Not only astrophysics: Fundamental physics studies with high energy missions

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Abstract: There are no doubts that high energy astrophysics has opened new views on the Universe and on the many classes of sources that populates the hot and energetic sky. However, in the near future, spectral, timing, and polarimetric observations at high energies are expected to address key scientific questions in fundamental physics. In this talk, I will first briefly summarise the potential of high energy astrophysics for physics studies, and then discuss in details two questions:

- How can we probe the state of baryonic matter at extreme densities, larger than several times the ones in the atomic nuclei, and expected in the cores of neutron stars?
- How can we constrain the properties of the dark matter particle candidate through high energy observations?

Matter inside neutron stars and objects in which dark matter is thought to cluster, are among the uncharted territories of fundamental physics. After having discussed the science case at the base of these two questions, I will review how current and future space missions could help us to answers those questions. (And of course, I will take the liberty to update you on those current and future missions).



Biography: Professor Andrea Santangelo studied Physics at the University of Palermo in Italy and later specialised in Astrophysics at the Institute of Cosmic Physics of the Italian National Research Council and at Columbia University. He is now Professor of High Energy Astrophysics and Director of the Institute of Astronomy and Astrophysics of the Eberhard Karl University of Tübingen, where he has also served as Chairman of the Physics Department. In 2009 he was granted a RIKEN Grant as distinguished Senior Scientist. In 2007 and 2010 he was co-recipients, as member of the HESS collaboration, of the European “Descartes” Prize and the “Bruno Rossi” Prize. In 2016 he was granted a CAS President's International Fellowship as Visiting Full Professor at IHEP, which was renewed in 2021.

Prof. Santangelo's research interests are in the field of multi-messenger astronomy with focus on High Energy Astrophysics, from a fraction of keV, in the X-rays, to 10^{21} eV in the Ultra High Energy Cosmic rays. He has participated, with leading roles, to many X-ray missions such as BeppoSAX, INTEGRAL, XMM-Newton, eROSITA, ATHENA and now eXTP and THESEUS. He is also leading research for the TeV observatories like HESS and CTA, and in the past, the EUSO program for the search of Ultra High Energy Cosmic Rays. He has published more than 600 articles in refereed journals in the fields above.