INTERNATIONAL SOLVAY INSTITUTES BRUSSELS

New Horizons Solvay Lectures in Physics

Kareem J. El-Badry (Caltech, USA)

Kareem El-Badry is an Assistant Professor of Astronomy at the California Institute of Technology. His research focuses on binary stars, black holes, and unusual outcomes of stellar evolution, combining large-scale surveys, targeted observations, and stellar modeling to understand how stars and compact objects form and evolve. He earned his Ph.D. in astrophysics from UC Berkeley in 2021 and was a Junior Fellow at the Harvard/Smithsonian Center for Astrophysics before joining Caltech in 2023. He also holds an adjunct appointment at the Max Planck Institute for Astronomy in Heidelberg, where he has been a frequent visitor since 2016.

The Gaia binary star revolution

By precisely measuring the motions stars on the sky over time, the Gaia mission is conducting a comprehensive census of the Milky Way's binary stars. These data are transformative both for population modeling and for discovery of rare objects. I will describe our emerging view of the populations of black holes, neutron stars, and white dwarfs in au-scale binaries, focusing in particular on their mass, period, and eccentricity distributions. Compared to previous surveys, Gaia is revealing post-interaction binaries in wider orbits, whose properties are difficult to explain with standard binary evolution models. I will discuss how the Gaia catalogs can be leveraged for statistical inference, despite their complex selection function, and how they can discriminate between competing formation models.

Monday 2 June 2025 at 4.00 pm.

COFFEE AND TEA WILL BE SERVED AT 3:45 P.M IN FRONT OF THE SOLVAY ROOM

UNIVERSITÉ LIBRE DE BRUXELLES
CAMPUS PLAINE - BOULEVARD DE LA PLAINE ACCESS 2 - 1050 BRUSSELS
Quartier Jaune - Building N.O. - 5th Floor - Salle Solvay

Kareem J. El-Badry will be visiting KU Leuven on 3 June and Liège U. on 4 June.

SYENSQO ADVANCING HUMANITY ULB VUB