



Institute colloquium

# Crazy Telescopes, Ghostly Galaxies, and the Invisible Universe

**Roberto Abraham**

University of Toronto

Host: Ilaria Caiazzo

In this talk I will describe the nearly unexplored universe of ghostly, nearly undetectable phenomena in the heavens. I will focus on why finding these “low surface brightness” objects is important, and why it has also been so devilishly difficult to find them using “normal” telescopes. We have probably been missing out seeing a vast range of exotic objects, like low-surface brightness dwarf galaxies, supernova light echoes, galactic halos, and planetary dust rings. These objects are nearly undetectable with conventional telescopes, but their properties may hold the keys to understanding a host of fundamental phenomena, including the nature of dark matter and the mechanisms by which galaxies form and evolve. These things are hard to study, but bizarre new telescopes, made possible by technological advances driven by mobile phone camera sensors and processors, and ubiquitous access to fast networks, are changing the landscape. The Dragonfly Telephoto Array (a.k.a. Dragonfly) is an example of this new class of telescope. Dragonfly is comprised of 168 off-the-shelf high-end telephoto lenses utilizing novel nanostructure-based optical coatings. I will showcase some early results from Dragonfly, and describe how this array is evolving to tackle the ultimate challenge in this subject: directly imaging the “Cosmic Web”. This is the largest collapsed structure in the Universe, and the repository of most of its matter. We know this web exists, but nobody knows what it really looks like, or how it funnels the gas created by the Big Bang into pockets of dark matter to drive the formation of galaxies. We are now building a massive expansion of the Dragonfly telescope that will let us take pictures of the Cosmic Web, and we hope to find these things out.

**Monday, October 28, 2024 11:30am - 12:30pm**

Raiffeisen Lecture Hall

---



This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station.  
Please find a schedule of the ISTA Shuttle on our webpage:  
<https://ista.ac.at/en/campus/how-to-get-here/> The ISTA Shuttle bus is marked ISTA Shuttle  
(#142) and has the Institute Logo printed on the side.

[www.ista.ac.at](http://www.ista.ac.at) | Institute of Science and Technology Austria | Am Campus 1 | 3400 Klosterneuburg