Department of Physics and Materials Science

SEMINAR

The Connection Between Black Hole Growth and Major Galaxy Mergers

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Abstract: A clear picture is forming, directly linking the most intense SMBH growth episodes (luminous Active Galactic Nuclei, or AGN) and major galaxy mergers. In this scenario, the more traditional AGN unification paradigm in which orientation is the main parameter only holds at lower luminosities. At the same time, for the more violent accretion events, originated by major mergers, we find evidence for an evolutionary sequence in which the AGN is first heavily obscured (Compton-thick) to reveal an unobscured quasar later.

Here, I will review the evidence from theory and observations in favor of this connection and present our computations of the integrated amount of SMBH accretion directly attributed to major galaxy mergers. I will then give estimates of how much SMBH growth activity we are currently missing. This missing piece in the puzzle is critical to reaching a complete census of the SMBH mass density in the Universe and its evolution. This comprehensive picture is fundamental to unveiling the deep connection between the central SMBHs and the galaxies hosting them. I will discuss how we can start to identify and characterize this still hidden population of rapidly growing SMBHs using a combination of X-ray, optical, near-IR, and mm/sub-mm observations obtained using Chandra, Keck, VLT, and ALMA, among others. Finally, I will present results from our multi-wavelength studies of a sample of nearby confirmed dual AGN (nuclear separation <10 kpc). Specifically, I will focus on our ongoing program to obtain optical and near-IR Integral Field Unit (IFU) spectroscopy and ALMA maps for several dual AGN at z<0.1, with nuclear separations ranging from ~5 kpc to ~200pc. These high-resolution multi-wavelength studies allow us to understand the complex connection between black hole growth and galaxy evolution in this critical stage.

Bio: Dr. Ezequiel Treister is an Associate Professor at the Institute of Astrophysics of the Faculty of Physics at the Pontificia Universidad Catolica de Chile. He got his Ph.D. in Astronomy in the joint Universidad de Chile/Yale program in 2005, working under the supervision of Prof. Meg Urry. Afterward, he was an ESO postdoctoral fellow with duties at the VLT from 2006 to 2008 and a Chandra/Einstein postdoctoral fellow at the Institute for Astrophysics of the University of Hawaii from 2008 to 2011. He was then appointed as Associate Professor at the Universidad de Concepcion in Chile until March 2016, when he started his current position at Universidad Catolica. Currently, as part of his sabbatical year, he is a visiting researcher at the NRAO in Charlottesville, Virginia. Prof. Treister's research focuses on studying the formation and growth of supermassive black holes, triggering mechanisms, and their connection to galaxy evolution.

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