Contribution ID: **3** Type: **not specified**

Invited Talk: Thomas Spieksma (Title: Black hole superradiance: a gateway to new physics)

Monday, 26 May 2025 13:30 (45 minutes)

Title: Black hole superradiance: a gateway to new physics

Abstract: Black holes in our Universe are not expected to reside in vacuum. Their environments—such as accretion disks or dark matter distributions—can significantly impact black hole physics, whether in isolation or in binary systems. A particularly intriguing environment arises from black hole superradiance: a process through which a spinning black hole transfers energy and angular momentum to a surrounding bosonic field. This interaction gives rise to a dense, atom-like condensate of ultralight particles. Such systems differ markedly from other astrophysical environments and may produce unique observational signatures. In this talk, I will explore two scenarios where these bosonic "clouds"could have observational consequences. First, I examine whether couplings to the electromagnetic sector could lead to detectable light emission from an isolated black hole-cloud system. Second, I investigate how these clouds influence binary evolution during an inspiral, with a focus on future gravitational wave detectors like LISA.