Contribution ID: **7** Type: **Student Talks**

Resonances, black hole mimickers and the greenhouse effects: consequences for gravitational-wave physics

Monday, 7 February 2022 20:40 (20 minutes)

Ultracompact objects with photonspheres are known to mimic many observational features of black holes. It has been suggested that anomalous tidal heating or the presence of resonances in gravitational-wave signals would be a clear imprint of a surface or the absence of a horizon. Such claims and studies are all based on a frequency-domain analysis, assuming stationarity. In this talk, we will see that the object needs to first "fuel-up"until it reaches the stationary regime. The presence of a stable light ring and large light-travel times inside the object may in fact delay enormously the "charging-up"and effectively contribute to the effacement of structure. In other words, black hole mimickers behave as black holes more efficiently than previously thought. Our results have implications for other resonant systems with sharp resonances, including "floating orbits"around spinning black holes.

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Track Classification: Student Talks