

Astrophysical Searches for Quantum Gravity: what multi-messenger observations can (and cannot) tell us

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What if there are already signatures of quantum gravity (QG) in the existing high-energy multi-messenger data – would we be able to know that?

In this talk, I discuss the complexities inherent in separating new physics from conventional astrophysical processes. Disentangling these two signals is not merely a technical challenge; it is an epistemic one. I argue that we are currently limited by what we can plausibly model, and entertain the possibility that some QG signatures may remain observationally undecidable even if they already exist. Finally, I discuss how a genuinely multi-messenger approach could help reduce degeneracies, ultimately enabling reliable constraints of QG phenomena.

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