

## **Ultralight DM constraints with Pulsar Timing Arrays**

*Wednesday, October 1, 2025 9:30 AM (45 minutes)*

Compact objects provide unique laboratories to probe the nature of dark matter. Millisecond pulsars, with their extraordinary timing precision and extreme densities, allow one to search for oscillatory signatures of ultralight dark matter fields, both through purely gravitational effects and via possible couplings to Standard Model particles. Pulsar timing arrays already constrain ultralight dark matter at masses near  $1\text{-}22\text{ eV}$ . Black holes, through superradiant instabilities and the formation of boson clouds, offer complementary constraints extending up boson masses of  $1\text{-}12\text{ eV}$ . I will review recent progress, including limits from pulsar timing and black hole spin measurements, and discuss prospects for future probes of dark matter with compact objects.

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