

Third Gravi-Gamma Workshop: The multimessenger view of the black hole life cycle



Contribution ID: 7

Type: **Invited talk**

Searching for Gravitational Waves with Gamma Rays

Friday, 7 October 2022 10:00 (30 minutes)

Pulsar timing arrays (PTAs) are long-term monitoring campaigns of many millisecond pulsars (MSPs). Their key science goal is the detection and characterization of the few-nHz gravitational wave background (GWB) expected primarily from the mergers of supermassive black holes. These waves are random (stochastic), but the shared vantage point of the earth introduces hallmark correlations in the data which encode the strength and nature of the GW sources. The Fermi Large Area Telescope has detected more than 100 MSPs, and with its accurate and precise timestamping, it is a gamma-ray PTA. Sensitivity to the GWB increases dramatically with longer data sets, and we recently derived an upper limit on the GWB which is competitive with radio observing campaigns but free from many confounding effects, like propagation through the ionized interstellar medium. Here, we summarize these original results, give an update based on proposed improvements to the measurement precision, and discuss prospects for the eventual detection and characterization of the GWB.

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Session Classification: Supermassive black holes