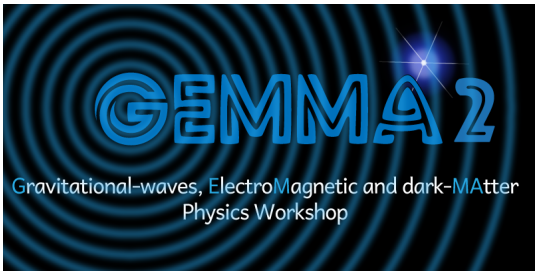

Contribution ID: **49** Type: **Invited Talk**

Gravitational-wave event rates as a new probe for dark matter microphysics

Tuesday, 17 September 2024 12:05 (25 minutes)

Next-generation gravitational-wave (GW) observatories will provide exquisite measurements of the merger rate of high-redshift binary black holes (BBHs), detecting many thousands of these systems every year. The abundance of these binaries is a direct tracer of the early stages of star formation, and therefore of cosmic structure formation. This raises the possibility of using GW observations to probe the microphysical properties of dark matter (DM), particularly warm, fuzzy, or interacting DM models which suppress the matter power spectrum on small scales, and therefore suppress the BBH merger rate.
I will describe recent work to model this suppression using a full end-to-end pipeline from DM model parameters to synthetic populations of BBHs. I will present forecasts for the third-generation GW observatories Einstein Telescope and Cosmic Explorer, showing that these will probe DM-neutrino interactions 100 times weaker than the most stringent present constraints.

Primary author: JENKINS, Alex (University College London)

Presenter: JENKINS, Alex (University College London)

Session Classification: Dark Matter

Track Classification: Dark Matter