Contribution ID: **61** Type: **talk**

Gravitational memory as a theory guiding principle

Wednesday 3 September 2025 15:20 (20 minutes)

The future space-borne gravitational wave observatory LISA may provide the first single event measurement of permanent marks in the fabric of spacetime that remember the passage of a gravitational wave. This effect, known as gravitational memory, is one of the most intriguing predictions of general relativity that has not been observed yet. After offering a particularly illuminating theoretical foundation of GW memory, this talk will offer insights into very recent work, showing that even before its first measurement, the phenomenon of gravitational memory already has noteworthy impact on the theoretical landscape of vector-tensor theories, with implications that reach all the way to the theory of classical electromagnetism.

Based on:
- JZ, Guangzi Xu, Benedetta Rosatello, Lavinia Heisenberg, "Constraining Superluminal Einstein-Æther Gravity through Gravitational Memory", accepted for publication in Phys.Rev.D (2025), https://arxiv.org/abs/2505.09544
- JZ, "Enhanced electromagnetic memory", under review in PRL (2025) , https://arxiv.org/abs/2507.09555
- Guangzi Xu, Benedetta Rosatello, Lavinia Heisenberg, JZ, "Gravitational Memory in Generalized Proca Gravity", under prep.

Further references:
- JZ, Lavinia Heisenberg, Nicolás Yunes, "Gravitational wave memory beyond general relativity", Phys.Rev.D 108 (2023) 2, 024010, https://arxiv.org/abs/2303.02021
- JZ, Guangzi Xu, Lavinia Heisenberg, "Unifying ordinary and null memory", JCAP 05 (2024) 119, https://arxiv.org/abs/2401.05936
- Henri Inchauspé, Silvia Gasparotto, JZ, et al. , "Measuring gravitational wave memory with LISA", (2024), https://arxiv.org/abs/2406.09228

Primary author: ZOSSO, Jann (Niels Bohr Institute, Center of Gravity)

Presenter: ZOSSO, Jann (Niels Bohr Institute, Center of Gravity)

Session Classification: Parallel Session A