

Directional response of the Astrometric Gravitational Wave Antenna in the context of multimessenger synergies

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Since the first detection of gravitational waves, the field of experimental gravitation is steadily working on improving the current detectors as well as developing new instruments in order to expand the range of observable frequencies and improve the reconstruction of GW direction and source parameters.

In such a context, the Astrometric Gravitational Wave Antenna (AstroGraWAnt, see for details <https://doi.org/10.1038/s41598-024-55671-9>) - which is based on differential relativistic astrometry and is devised as a telescope pointing simultaneously at three (or more) pairs of line-of-sights - represents a promising concept to achieve the aforementioned goals.

The talk focuses on two fundamental performance characterizations of AstroGraWAnt.

First, after recalling its operational principle, we present how AstroGraWAnt collects gravitational wave signals from arbitrary directions, by deriving its pattern functions for different configurations.

Second, we compare the above results with the directional response of other detectors, and we discuss complementarities and possible advantages achievable with the astrometric antenna, like, e.g., a quasi-isotropic sky coverage.

Finally, we evaluate more convenient configurations for AstroGraWAnt, highlighting how the combination of more antennas –or, equivalently, employing more than three pairs of line-of-sights - is a way to reach higher values in the sky localization of the sources.

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