

Peer Review

Review of: "Outer Solar System Spacecraft Without Drag-Free Control to Probe the μHz Gravitational Wave Frontier"

Lennart Wissel¹

1. Max Planck Institute for Gravitational Physics (Albert-Einstein-Institute), Potsdam, Germany

The article "Outer Solar System Spacecraft Without Drag-Free Control to Probe the μHz Gravitational Wave Frontier" presents an extensive and thorough analysis of three different types of space missions that can be considered as going beyond the LISA theme. It incorporates research from a variety of related fields and derives the prospects of these missions to detect gravitational waves with varying sensitivities in the μHz regime beyond 10 AU, where the accelerations that are distorting the measurements are small enough to avoid drag-free controlled test masses.

It extends previous ideas for Doppler tracking and LISA-like missions and considers both modes of operation for radio and laser systems. To my knowledge, this appears to be a significant body of new work, establishing more realistic baselines and including many technical details and noise effects.

I recommend this article to be published and have mainly minor comments.

The instrumental considerations could be extended in future work, using more realistic noise models as are being built for LISA. I am doubtful about the proposed lock acquisition for the low carrier to noise densities for a LISA-like configuration.

Those comments I have can be found in the attached PDF (for reference: I used 'Foxit PDF Reader' to create the comments in case they are not displayed properly). However, please note that radio astronomy and the corresponding outer solar system characteristics do not correspond to my direct field of work.

Attachments: available at <https://doi.org/10.32388/P3DCHK>

Declarations

Potential competing interests: No potential competing interests to declare.