

Search for gravitational wave trains with the spacecraft ULYSSES

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Abstract

We report on the search for periodic gravitational wave signals in the mHz band conducted with the spacecraft ULYSSES. Gravitational wave signals **generally** provide information about the distance of the source; ULYSSES' data have a "ken" for each kind of source one looks for; for binaries the galactic centre is accessible to our experiment. The Neyman Pearson method, with its two strategies of 'attempting detection' and getting a threshold for no detection, is discussed with great care. With it we did not find significant evidence for positive detection, but established, at the 90% confidence level, upper limits to the amplitude significantly better than previous work. The weaker condition $\text{SNR} = 1$ corresponds to signal amplitudes h which vary from 10^{-5} to $4 \cdot 10^{-6}$ for different frequencies. Similar results and thresholds have been obtained for chirped signals. These upper limits **have** interesting astrophysical consequences for a possible binary of massive black holes in the galactic centre.

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