

Gravitation astrometric measurement experiment

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Abstract The Gravitation Astrometric Measurement Experiment (GAME) is a mission concept based on astronomical techniques (astrometry and coronagraphy) for Fundamental Physics measurements, namely the γ and β parameters of the Parametrized Post-Newtonian formulation of gravitation theories extending the General Relativity. The science case also addresses cosmology, extra-solar planets, Solar System objects and fundamental stellar parameters. The mission concept is described, including the measurement approach and the instrument design.

Keywords Experimental test of gravitational theories · Astrometry

1 Introduction

The experiment of Dyson, Eddington and Davidson, whose concept is sketched in the left panel of Fig. 1, gave the first confirmation of Einstein's General Relativity theory by observations of known stellar fields during the May 29th, 1919 eclipse. It measured the apparent positions of a few stars, within a few degrees from the solar limb during the eclipse, compared to their unperturbed relative positions (e.g. in night time observations a few months away). The arc variation is interpreted in terms of light deflection, providing an estimate of the related γ parameter of the Parametrized Post-Newtonian formalism (PPN, Section 2.1) with precision $\sim 10\% = 10^{-1}$. Measurements of light deflection from the ground are affected by several shortcomings, like the short eclipse duration, the high background flux from the solar corona,

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