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A FEASIBLE METHOD TO MEASURE THE EARTH'S GRAVITY FIELD USING ATOM-INTERFEROMETRY-BASED GRAVITY GRADIOMETER IN SPACE

Abstract

The electrostatic gravity gradiometer has been successfully used as a core sensor in satellite gravity gradiometric mission GOCE, mapping the Earth's gravity field with a high spatial resolution of 100 km. In order to improve the precision of satellite gravity gradiometry, atom-interferometry-based gravity gradiometer has been proposed as a candidate in future due to its greater sensitivity in microgravity environment. In this paper, we introduce a feasible space-borne measurement method for the atom-interferometry-based gravity gradiometer, which is quite different from that on ground. The simulation results show a great improvement of the Earth's gravity field recovery precision by using this type of gravity gradiometer, and it will significantly advance our knowledge of the solid Earth, oceans, and underground water.