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Constraints on ultralight axions and gauge bosons from geodetic and frame-dragging measurements (Postponed)

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The geodetic and frame-dragging effects are the direct consequences of the spacetime curvature near Earth which can be probed from the Gravity probe B (GP-B) satellite. The satellite result matches quite well with Einstein's general relativistic result. The gyroscope of the satellite which measures the spacetime curvature near Earth contains lots of electrons and nucleons. Ultralight axions, and vector gauge bosons, can interact with these electrons and nucleons through different spin dependent and spin-independent operators and change the drift rate of the gyroscope. Some of these ultralight particles can either behave as a long range force between some dark sector or Earth and the gyroscope or they can behave as a background oscillating dark matter fields or both. These ultralight particles can contribute an additional precession of the gyroscopes, limited to be no larger than the uncertainty in the GP-B measurements.Compared with the experimental results, we obtain bounds
on different operator couplings.

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