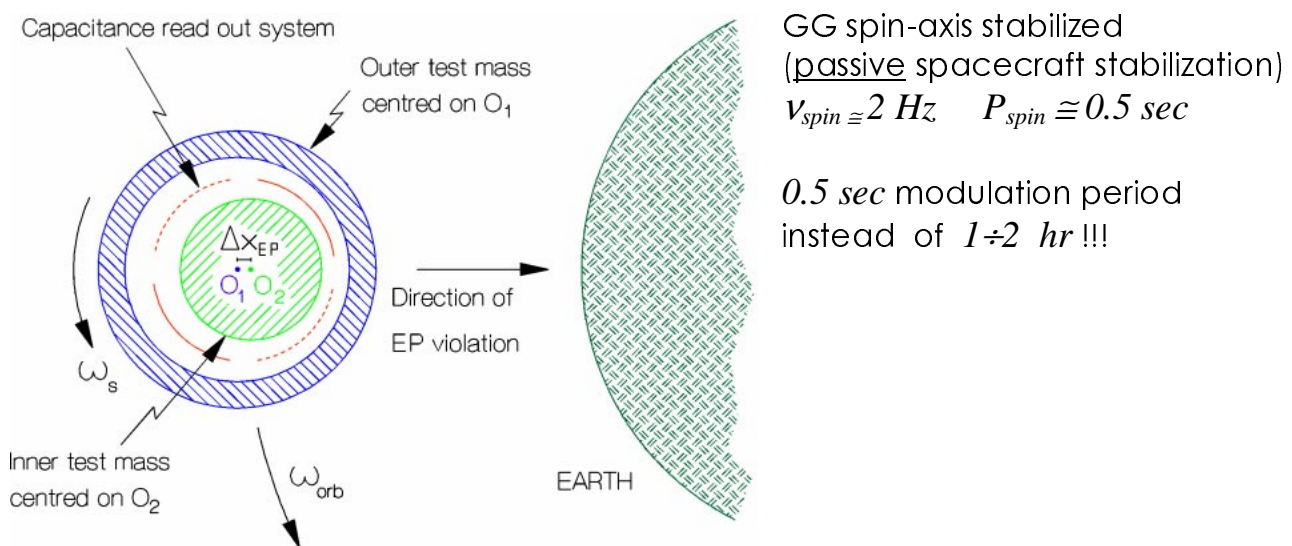


Why the GG Design? Novelties and Advantages (I)

- A torsion balance is not suitable for space
- Coaxial test cylinders help avoid classical differential effects (tides) and are the best set-up for EP testing in space

High frequency Modulation

- GG follows the trend indicated in history of EP testing: increase the modulation frequency as much as you can



High frequency modulation helps reduce: electronic "1/f" low frequency noise (electronics is known to work much better at high frequencies); and mechanical noise (quality factor Q at spin frequency much higher than at the much lower natural frequencies)

$\Delta x_{EP} \approx 6.3 \cdot 10^{-3}$ Angstrom expected displacement $\eta = 10^{-17}$
transformed into an electric potential signal ≈ 1.2 nV

- STEP signal at orbital frequency

STEP signal frequency 10^4 times smaller than GG spin/modulation frequency

STEP spacecraft needs very accurate active control
In order to be maintained space fixed

Higher frequency modulation (to distinguish signal from disturbances at orbit frequency) can only be provided by slow rotations of the STEP spacecraft

