Why the GG Design? Novelties and Advantages (VII)

No Major Electrostatic Effects

- Electric charging is very dangerous in small force gravitational experiments.
- GG has no floating masses. Conductive mechanical suspensions and coating with a thin layer of conductive material provide electrostatic discharging with non need of active devices for charge measurement and discharging (which disturb the measurement)
- Only small patch effects remain which are either DC or slowly varying

- STEP (M2, Phase A 1993) had a radiation sensor to discard contaminated data
- STEP (M3, Phase A 1996) had a $130\ kg$ tungsten shield and a discharging device

No Magnetic Shield Needed

The largest competing effect is due to the interaction between the residual magnetic moment of one test body with the magnetization induced on the other by the dipole magnetic field of the Earth: It is enough to avoid magnetic impurities $\Rightarrow$ GG needs no magnetic shielding

Major Effect from Earth Tides at twice the Spin-Signal Frequency

- The offset vector $\vec{\varepsilon}$ between the test cylinders is fixed in the rotating frame (it is due to mounting and construction errors) $\Rightarrow$ the frequency of the tidal differential signal detected by the spinning sensors is twice the spin/signal frequency , just as it happens in the case of lunar tides on the Earth (they are at half the synodic day of the Moon)

- Tides due to displacement of the test bodies along the z (spin) axis give a component competing with the signal at a frequency close to the spin frequency –though not exactly– (if the spin axis is not exactly normal to the orbit plane) $\Rightarrow$ Δz caused by differential effects from solar radiation pressure should not be too large: it is enough to compensate for non gravitational forces along z (drag free control) by a factor 1/150.