Follow-up and checkpoints of magnetic axis at 300 and 1.9K

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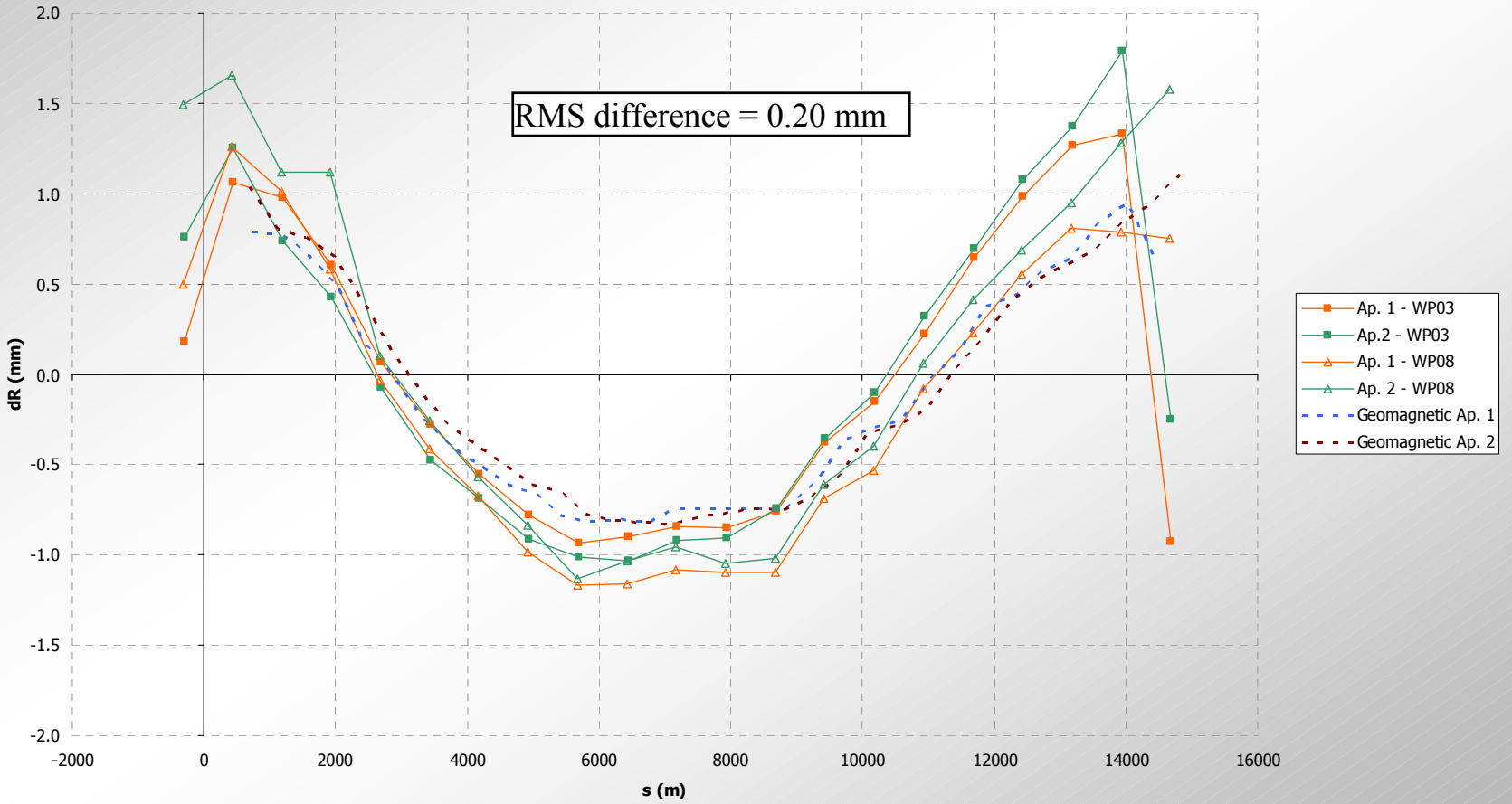
1. Magnetic axis equipment
2. Measurement examples
3. Follow-up in industry
4. Follow-up at CERN
5. Outstanding issues

1 – Magnetic axis equipment

Instrument	Destination	Capabilities	Status
Fraunhofer warm mole	CERN (SMA18)	Magnetic axis (QCD, correctors) Harmonics + angle	1 unit at CERN (now under repair) 1 + ½ units expected Q4 2003
Fraunhofer cold mole	CERN (SM18)	Magnetic axis (QCD, correctors) Harmonics	1 units expected Q3 2003
MAS AC warm mole	Industry CERN (SMA18)	Magnetic + geometric axis (QCD, correctors)	2 unit operational at CERN 6 units in industry expected 05/2003
MAS AC cold mole	CERN (SM18)	Magnetic axis (QCD, correctors)	2 units expected 04/2003
Single Stretched Wire	CERN (SM18)	Magnetic axis (SSS,correctors) $L_{magnetic}$, angle	1 unit operational 1 unit expected Q3/2003

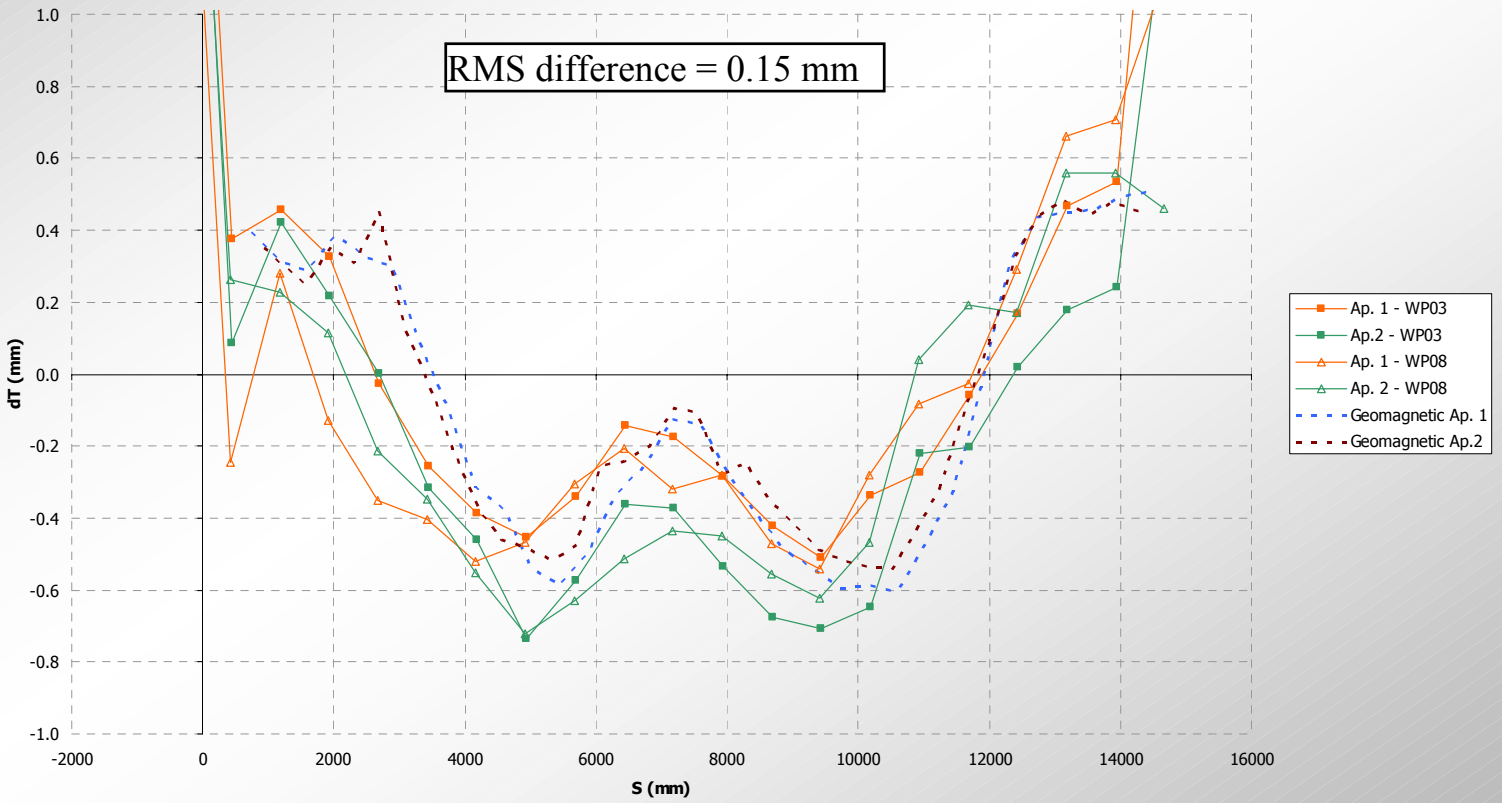
2 – Measurement examples

Magnetic axis (QCD) of 3002
horizontal offset w.r.t. theoretical geometry
comparison of Fraunhofer and AC mole before and after cold tests



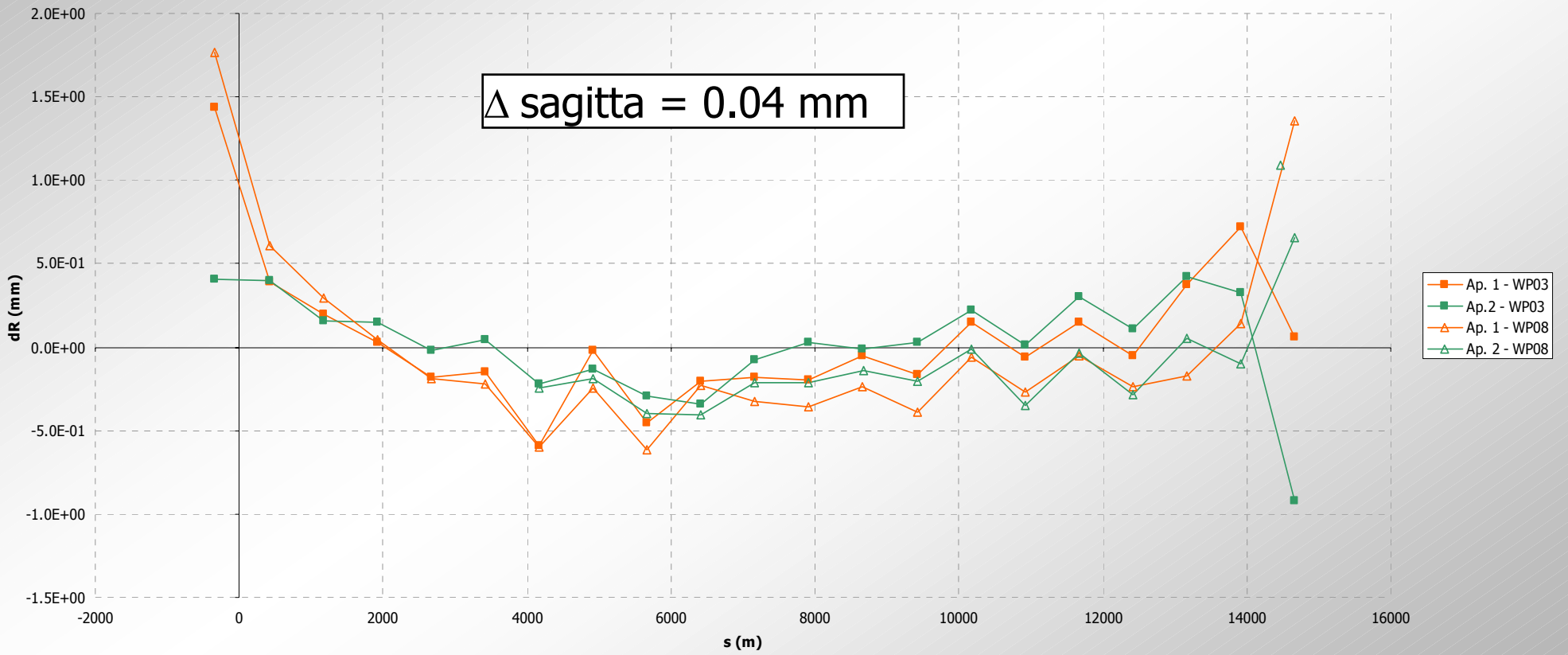
2 – Measurement examples

Magnetic axis (QCD) of 3002
vertical offset w.r.t. theoretical geometry
comparison of Fraunhofer and AC mole before and after cold tests



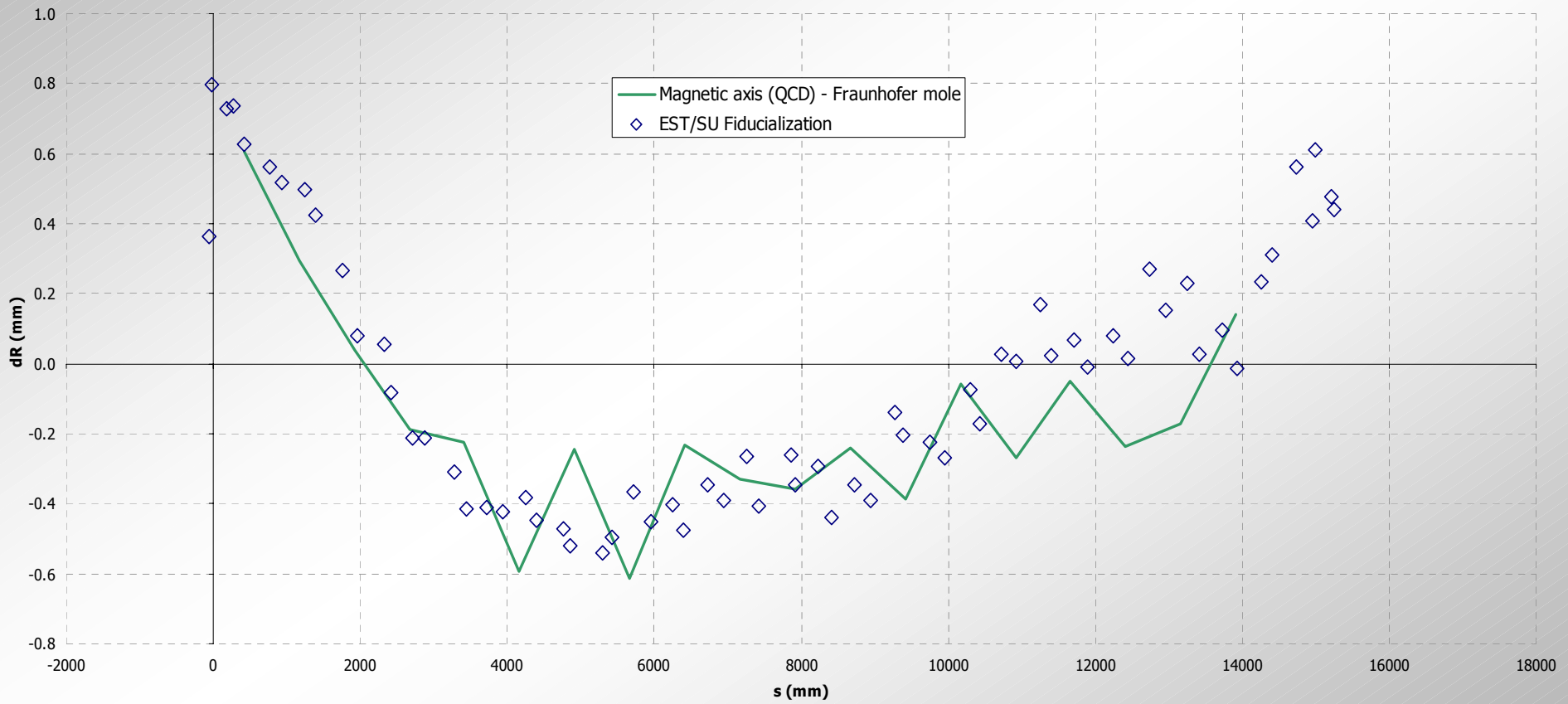
2 – Measurement examples

Magnetic axis (QCD) of 1010 (Fraunhofer mole)
horizontal offset w.r.t. theoretical geometry
comparison of measurements before and after cold tests

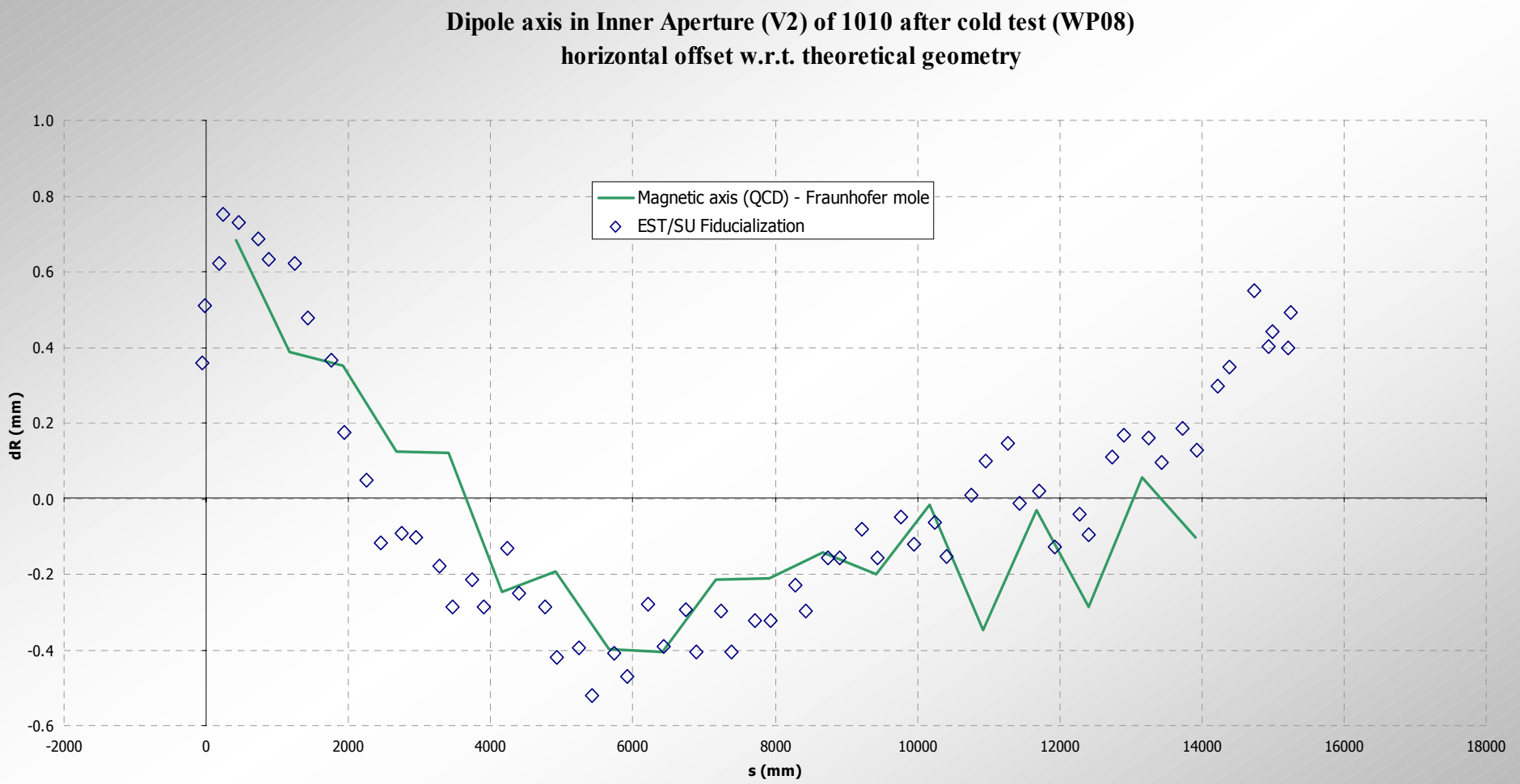


2 – Measurement examples

Dipole axis in Outer Aperture (V1) of 1010 after cold test (WP08)
horizontal offset w.r.t. theoretical geometry



2 – Measurement examples



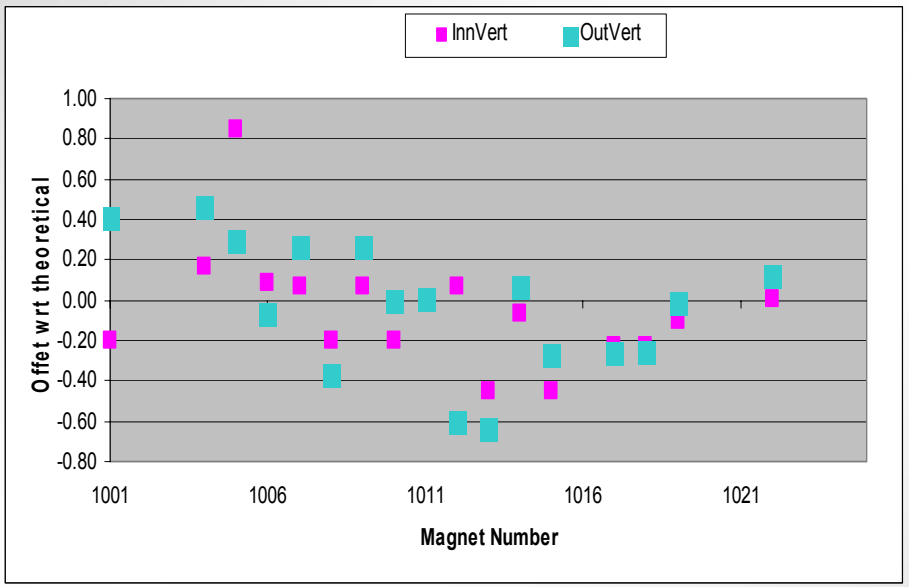
3 – Follow-up in industry

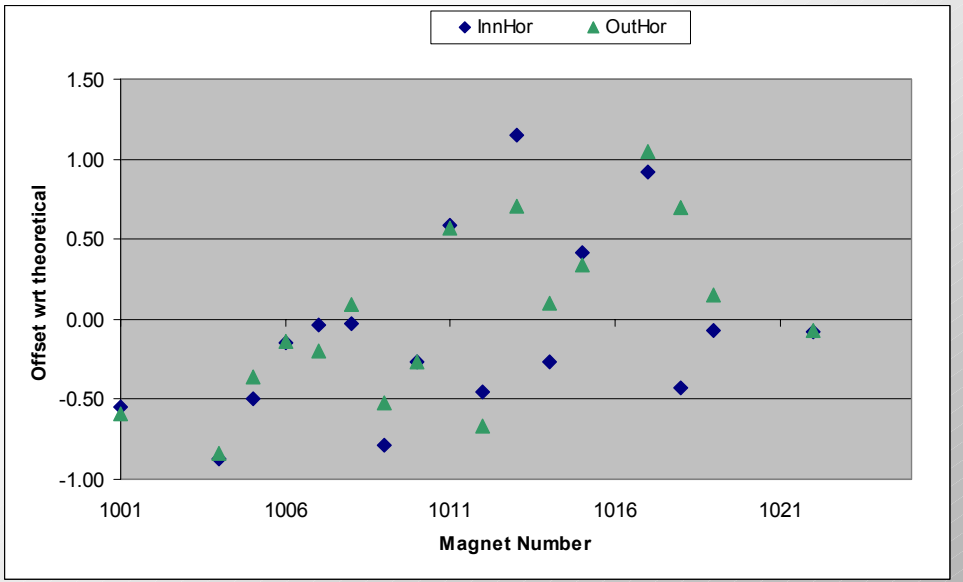
Measurements with 2 × MAS AC Moles at each producer's premises:

Cold mass (before delivery to CERN)

Checkpoints:

a) shape of magnetic and mechanical axes (mean plane)
b) offset DX,DZ of corrector centre w.r.t. theoretical shape





4 – Follow-up at CERN

- **MAS AC mole measurements now done on cryostated magnet (survey includes magnet fiducials)**
- **Fraunhofer test bench now being adapted to measure naked cold mass**
- **Tests ongoing to ensure consistency of results between the two different types of moles**

Step	Device	N. of tests	Checkpoints
Reception WP01 (cold mass)	AC mole (Fraunhofer)	No longer done, except for special reasons ~5% random sample check	- shape of cold mass (sagitta) - spool pieces wrt theoretical geometry -distance magnetic/mechanical axis
WP03 (cryostated)	Fraunhofer (AC mole)	100% originally foreseen for pre-series, 50% realistic target due to equipment failures ~5% random check for series	-shape of cold mass -spool pieces wrt theoretical geometry -distance magnetic/mechanical axis
Cryogenic Tests	AC/Fraunhofer cold moles (SSW)	100% originally foreseen for pre-series, target now = 30% due to delivery delay ~5% for series	-as above -cold/warm correlation
WP08 (before storage)	Fraunhofer (AC mole)	100%	-as above

5 – Outstanding issues

1. **Cross-check of magnetic axis measurements done with different systems**
   (tests being done, results expected in April)
2. **Correlation between warm-cold magnetic axis**
   (First tests expected to begin in May)
3. **Mechanical stability of dipole shape before/after cold test**
   (analysis on tested magnets being carried out now)