

DSA324 Transfer Function – Spacial Distribution II

DSA324 transfer function showed a large gradient in the LAB2 magnetometer measurement¹. The check for this phenomena was made using Rawson-Lush probe². The R-L measurement result was inconsistent with the magnetometer result. I have made a ESR measurement after the warm-up of the magnet to see this effect. Fig.1 is the results from two independent scan. The difference between tow runs may be due to the hysteresis behavior of iron. Since the magnet has already excited up to very high field, the iron is magnetized in one direction. One measurement at current level 3.000A had 3.4463 mT while the revasal of the current made 2.81384 mT. Though the averaged transfer function was 1.04502 which is about what it is expected, there is as large hysteresis as 0.63246 mT. Fig2. shows the spatial resolution and the repeatability of the measurement. From this data one can say the measurement is good to $1\mu T$. Fig1. also shows the geometry of the magnet. DSA324 has 6 of 6-in collar packs and 4-in collar in the both ends. Central part of the yoke is a 24-in pack. Both end have 10-in yoke packs. The deviation of the field is more related with the collar pack structure than the yoke-pack structure. The effect of the gaps between collar packs are seen as the dip of the field. Although there is no large gradient over the entire length of the magnet as was observed at low temperature.

The R-L data in the reports^{1,2} of Tariq and Steve had a wrong x-axis calibration as they warned in their reports. Probably the starting point of the measurement was misrecorded. The corrected data in Fig3 shows consistent results among all the cold measurements. The relationship between magnetometer results and R-L results is explained by the averaging over the length of the rotating coil. It seems like DSA324 has some anomary in the collar packages in the return end half of the magnet. The comparison of ESR data with these data are shown in Fig4. R-L data in this figure is shifted to adjust the remnant field. Signal of pressure gauge package is an evidence of the right scaling of x-axis.

*Distribution: R.Bossert, J.Carson, S.Delchamps, S.Gourlay, T.Jaffery, W.Koska, M.Kuchair, M.Lamm, G.Pewitt, R.Sims, J.Strait

¹S.Delchamps: TS-SSC-91-173

²T.Jaffery: TS-SSC-91-174

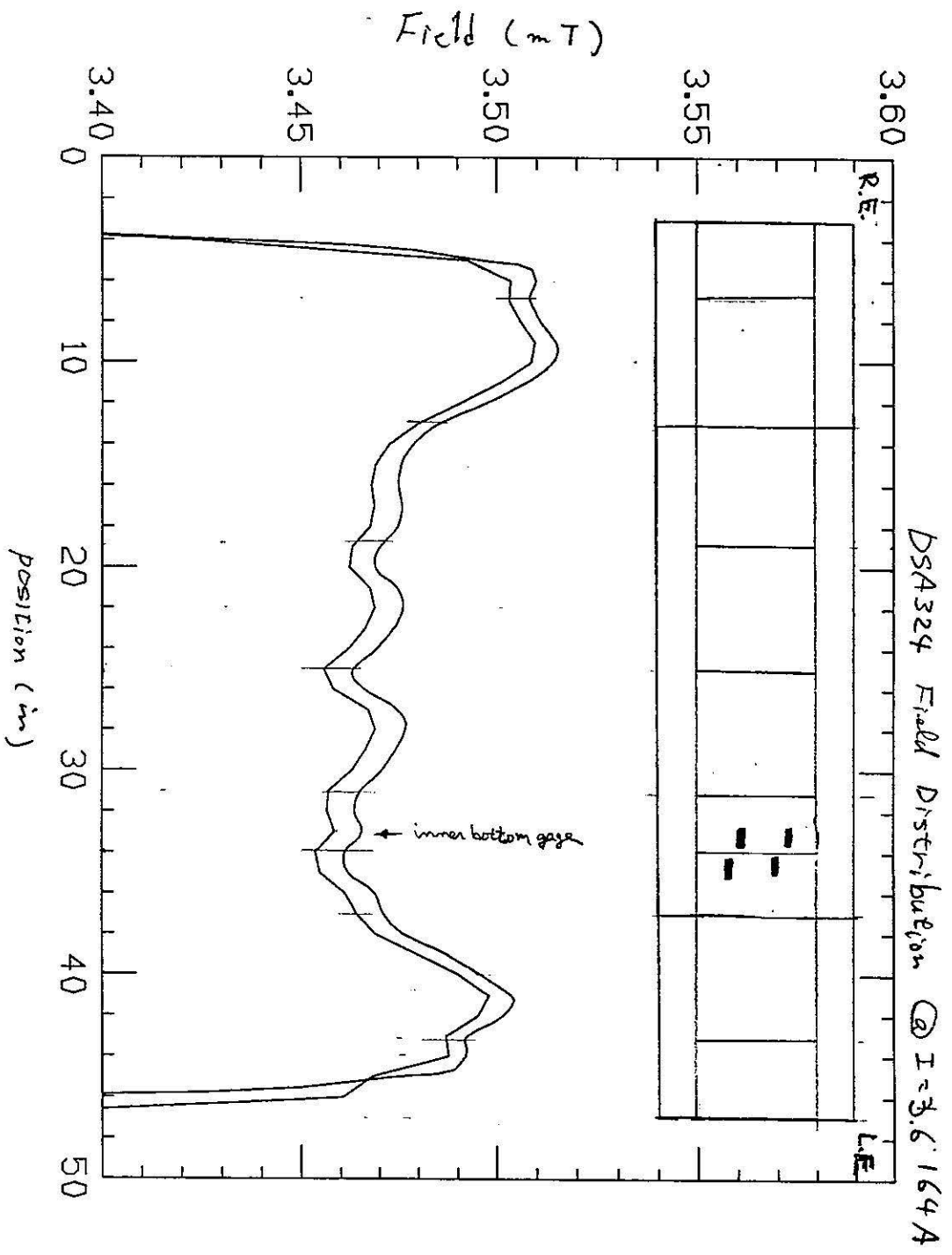


Fig 1

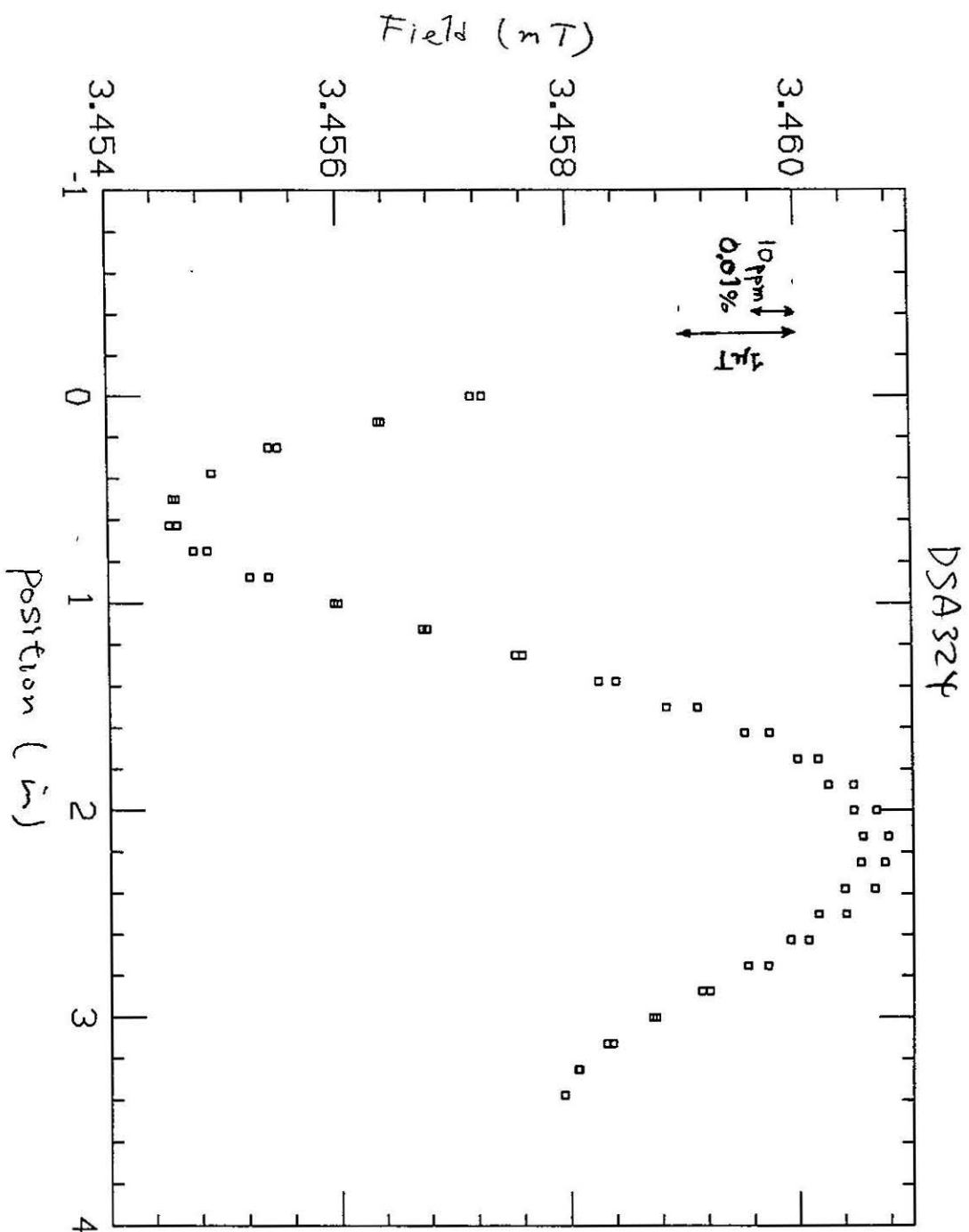


Fig 2

DSA324 Dipole Field

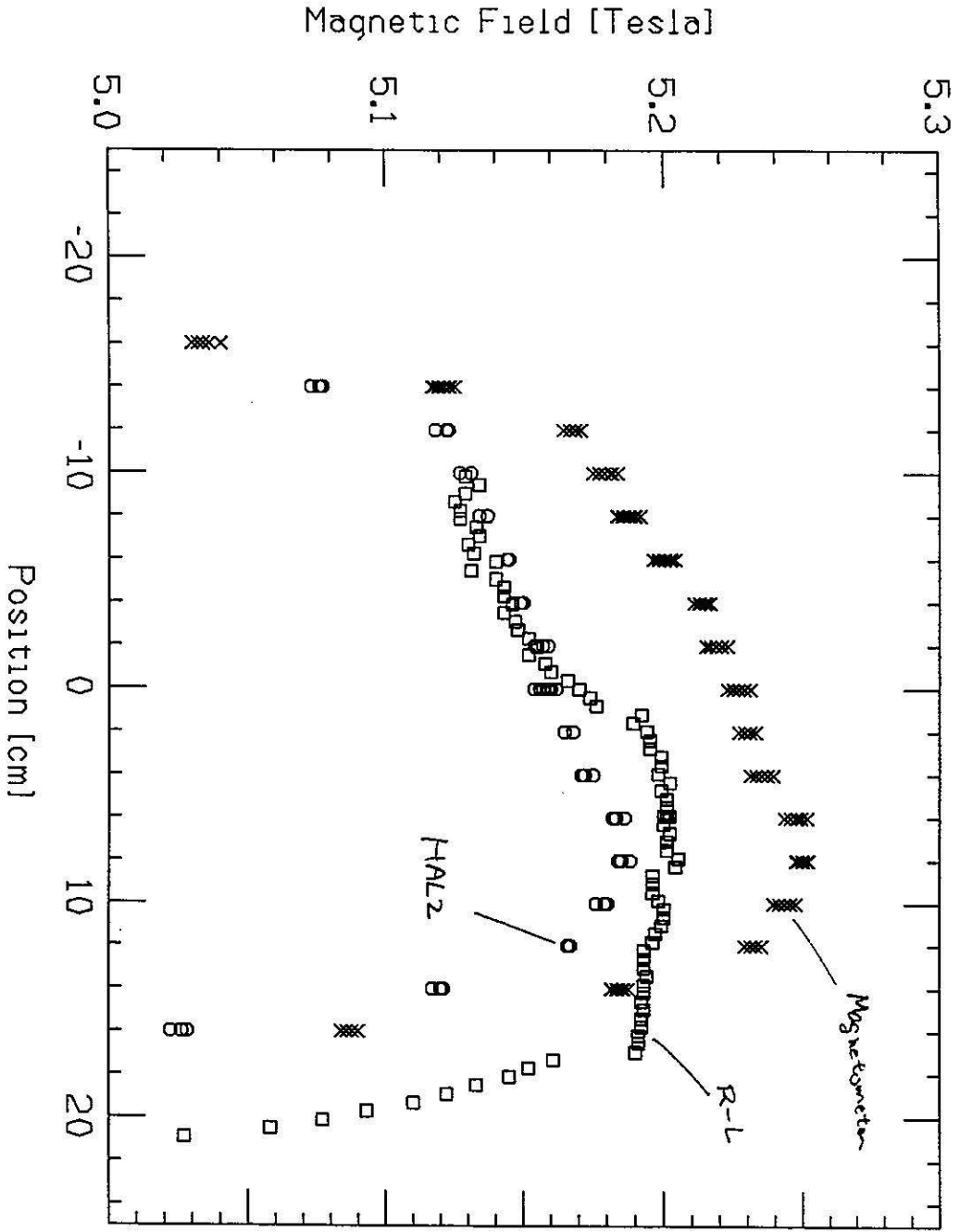


Fig 3

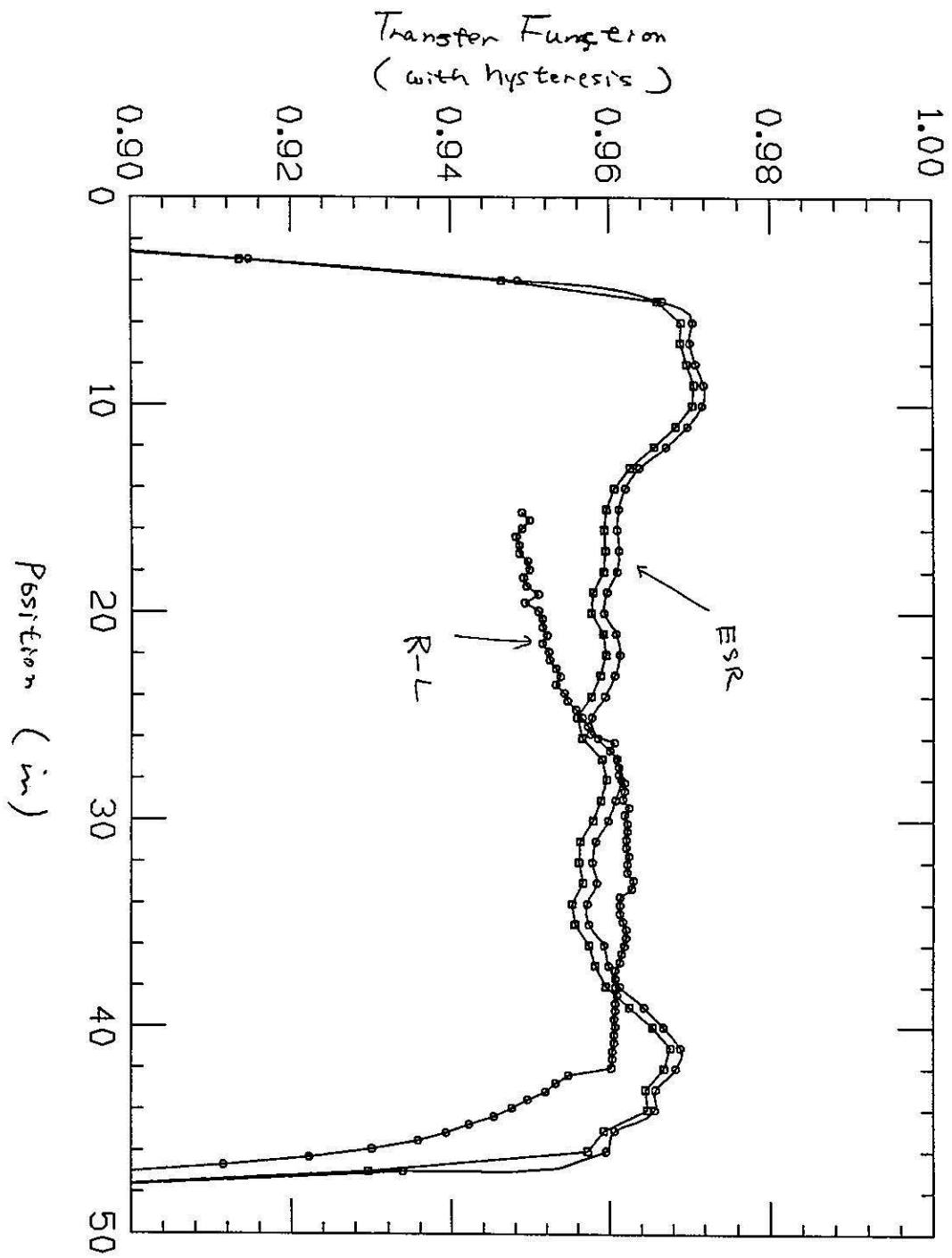


Fig 4