Duke characteristics

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In the following table, I present the results and the comparison of Duke polarization tests in April 2002 and in May 2002.

Nominal Density (amg)	9.18
Volume Total (cm^3)	199.9
Volume PC (cm^3)	113.8
Volume TC (cm^3)	82.6

Duke	April 15, 2002	May 23,2002
$T_{predicted}$ (°C)	222.5	233.1
PC Density (amg)	7.28	7.24
TC Density (amg)	11.78	11.83
EPR constant	5.63780	5.69135
EPR max. polarization	$(40.4 \pm 1.3)\%$	$(46.0 \pm 0.4)\%$
EPR-NMR calibration	$(2.71 \pm 0.3)\%/\mathrm{mV}$	$(2.92 \pm 0.08)\%/\mathrm{mV}$

Comments:

The maximum polarization difference doesn't come from the EPR constant but certainly from the realignment of the 3 lasers and I don't remember whether or not in April we pumped Duke with the two new lasers. Right now we are pumping Duke with laser#3, #4 and #5 (laser#3 and #4 are the new lasers). So it could be another explanation.

I did two calculations on the same EPR spectrum:

- with the old EPR constant: $P_{old} = (46.6 \pm 0.4)\%$,
- with the new EPR constant: $P_{new} = (46.1 \pm 0.4)\%$.

So the difference between the two EPR constant doesn't create such a big change of polarization.

Then I applied the polarization gradient correction: $P_{new} = (46.0 \pm 0.4)\%$.

Last point: I performed an EPR measurement right before starting temperature test. Thus I can compare it with the first NMR measurement of the temperature test since the temperature of the cell was stable: an estimation of the EPR-NMR calibration constant is $c = (2.92 \pm 0.08)\%/\mathrm{mV}$.