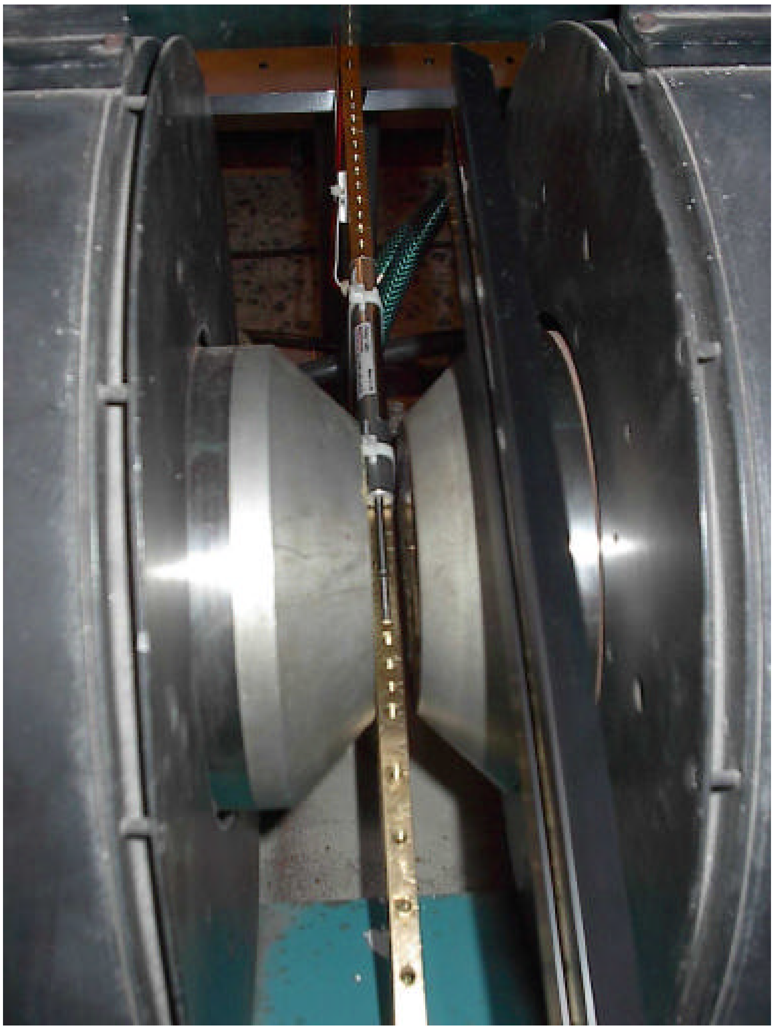
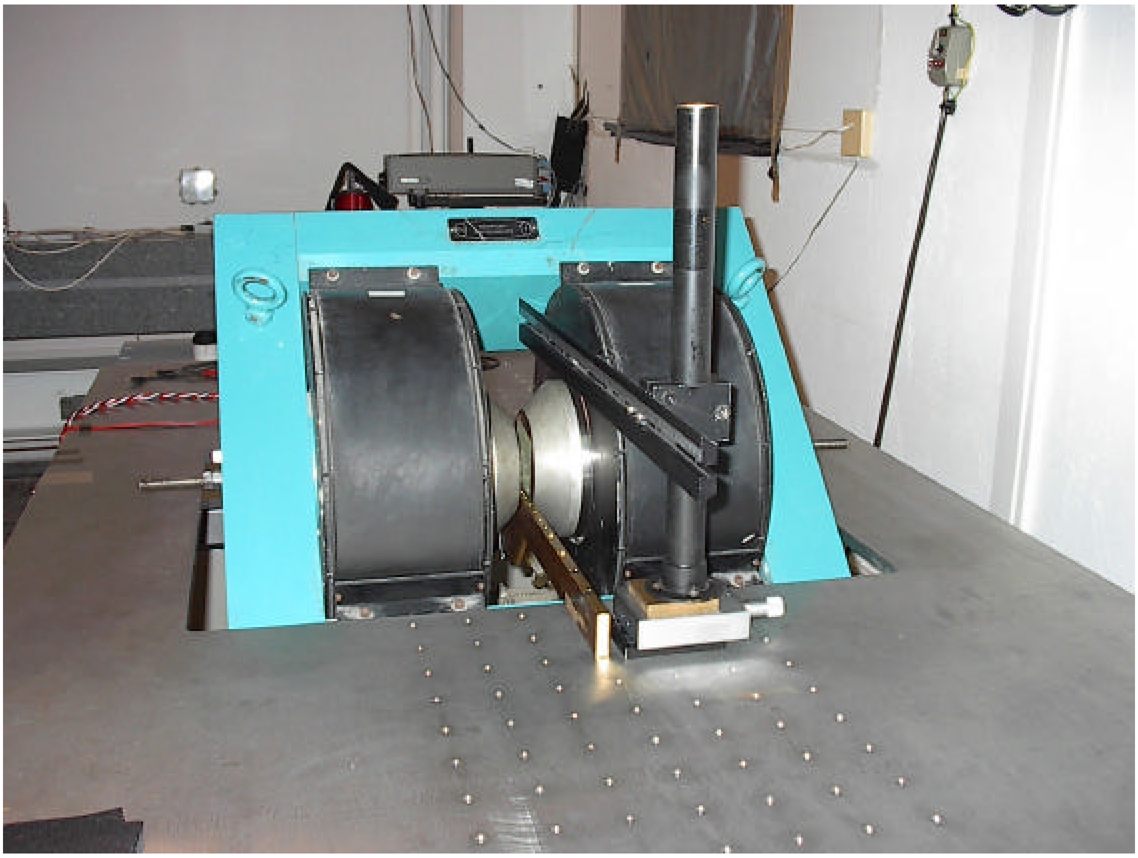
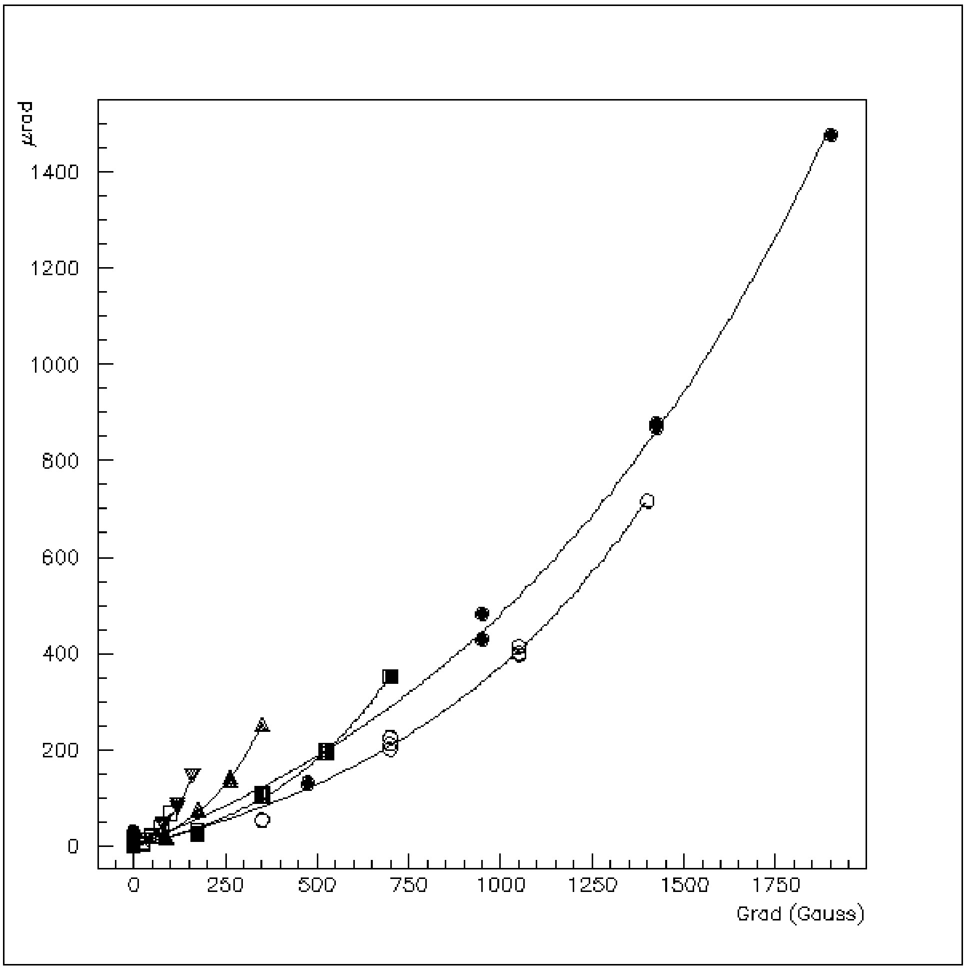
Concerning the behavior of the sensors in magnetic field, we would like to know if you have more recent tests or your statements are still based on the old work by Todd Johnson, because the results we have obtained are not consistent with those. Let us explain our procedure, results and interpretation.

To do this test we are using an electromagnet, whose current can be varied continuously and therefore we can obtain different field intensities just by turning the power supply controls. The magnet is embedded in an optical bench, with a supporting bar connecting the two parts of the bench through the magnet gap. The picture below shows an example of the setup (with a different sensor). The tiltmeter are fixed in this bar. The system was found to be stable for long periods if the magnet was switched off.

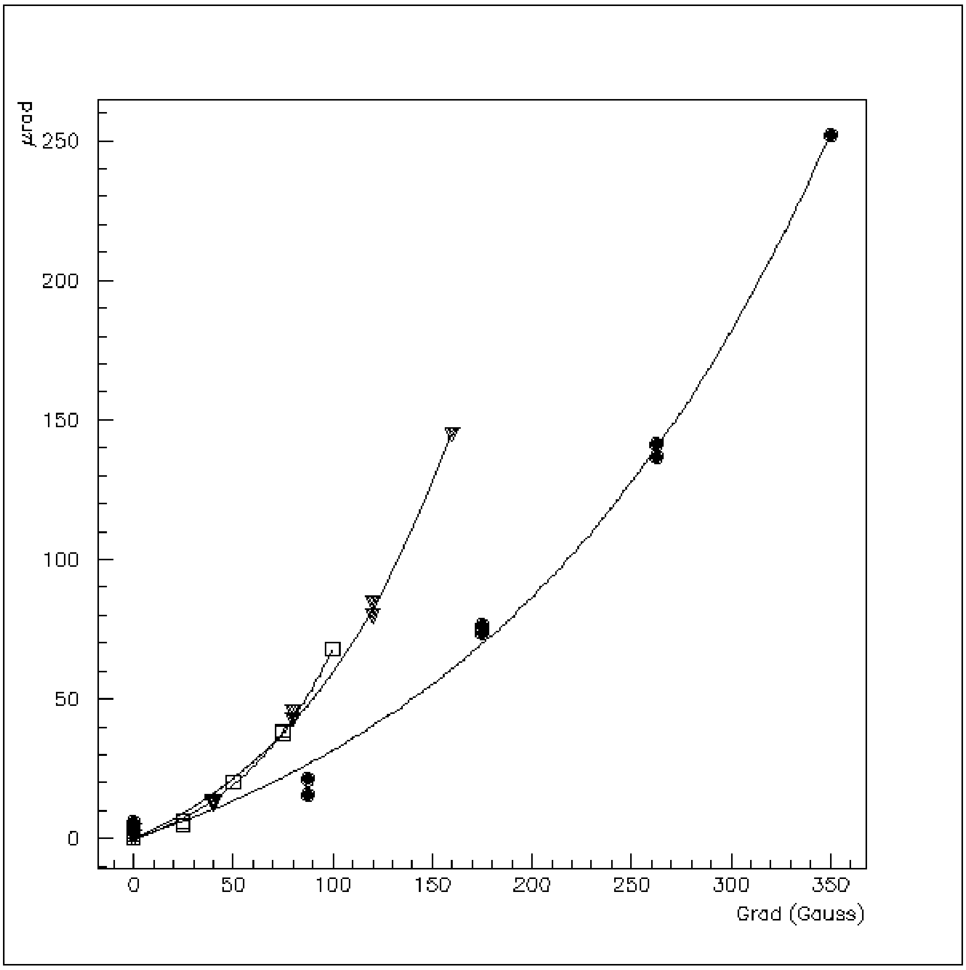




For the configuration used for the tiltmeters a maximum field of 1.35 Tesla was reached. The field was always horizontal and perpendicular to the long dimension of the sensor. By changing the position inside the field we could test the response of the sensor to different gradients. We have tested up to 2000 Gauss=0.2T difference between the two edges of the sensor. It is important to remark that for a given position, when raising the current, both the field and gradient increased proportionally so that $\Delta B/B$ is constant. The results are summarized in the following figure. With the sensor positioned in different magnetic field conditions, we increase gradually the current to the maximum and then decrease it to 0. We represent there the variation of the response in μrad as a function of the gradient.



Each *branch* corresponds to different positions in the field, therefore different ΔB/B. The highest point in each branch corresponds to the maximum magnetic field of 1.35 T. The line superimposed is the exponential fit you propose, that fits very well. However, this plot is not compatible with the fact that only the gradient affects the response, because in that case we would expect all the branches to sit on top of each other (have the same parameters in the exponential fit) which is not the case. The next figure shows a zoom of the previous one, where we see in addition, that the effects are significant even below 100 Gauss in opposition to your previous indications.



Our interpretation is that both the field and the gradient affect, although it seems true that there is no degradation if the gradient is 0 regardless to the field intensity. We have found a reasonable parametrization as $\alpha*\Delta B/B*(e^{\lambda B}-1)$, for $\Delta B/B<15\%$. For higher gradients there is a non-linear behavior we could not model.

Another thing we observed is that when applying a strong field and gradient, the sensor took some time to stabilize (few minutes), as it something was really moving inside. Do you have any idea of the intrinsic behaviour of the sensor that could explain this fact together with the exponential growth in field and more or less linear in gradient? Is the bubble moving? If so, why? Are we distorting the electron flux in the liquid? This is more easy to understand, but then why is exponential, why this long time to stabilize...?