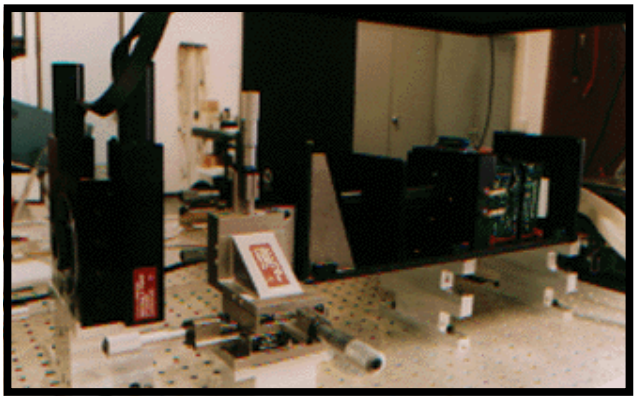
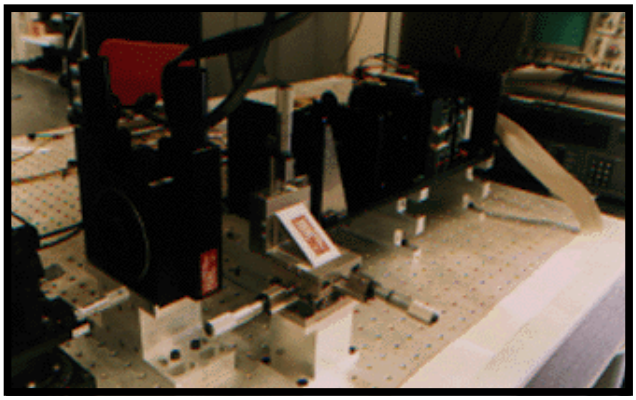
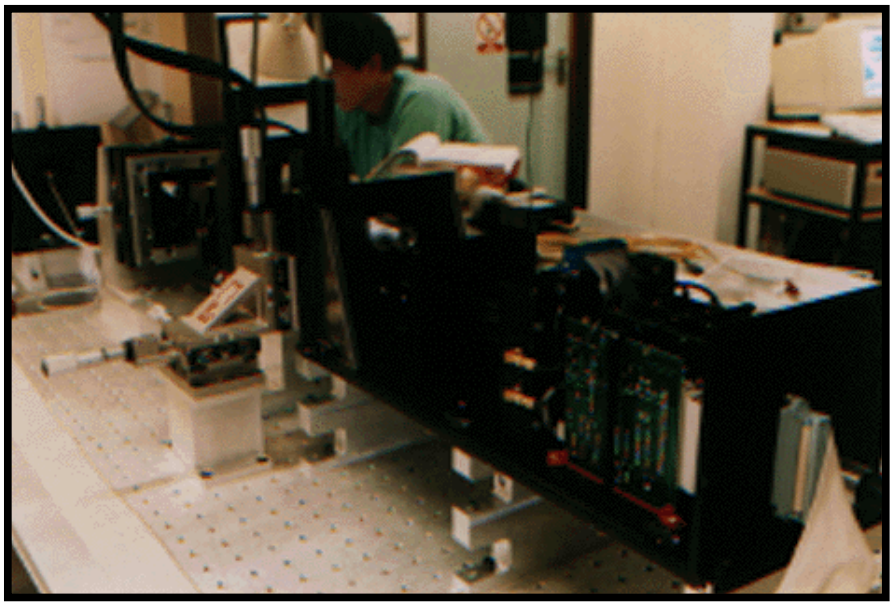
Appendix D

The photo album:

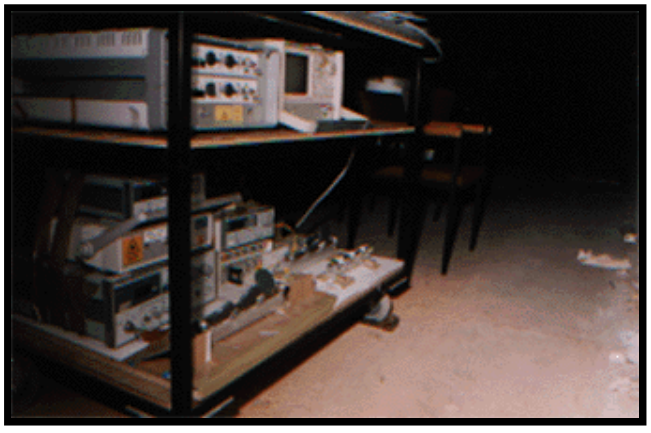




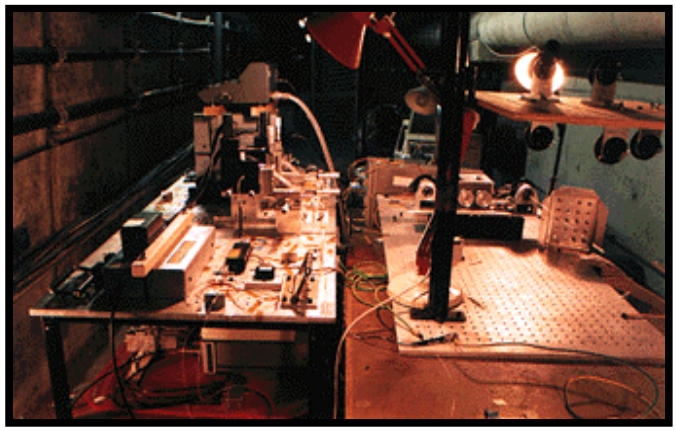


The above photographs show the Essex polarimeter with the calibration set-up for measuring the polarimeter transfer matrix.

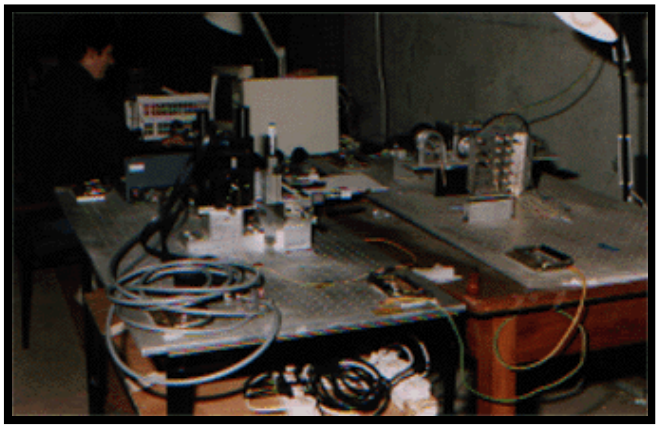
The tunnel viewed from the far end. Purely for information, on the left side of the figure, we can see the old water pipes supplying the University and on the right side the 3 phase power cabling. The useable tunnel length for our measurements is about 70 metres (one way), and we are about 5 metres below ground. The average temperature, during both summer and winter, is about 15°C and the humidity is very high.



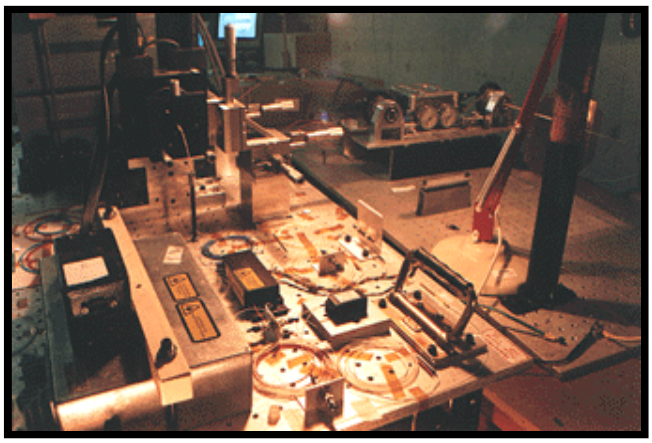
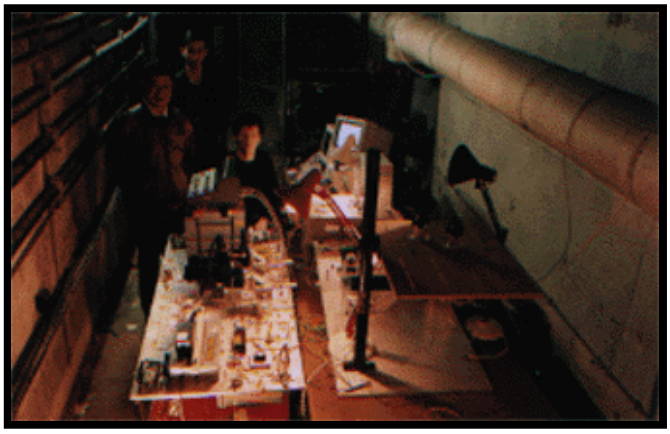
The left picture shows the single channel polarimetric OTDR in the tunnel. It is possible to see the modified OTDR, the control box for the gating of the pulse on the top shelf and the erbium amplifiers with pump controls on the bottom shelf. In the right picture, we have all the comforts of home, table and chairs !

Some discussion with Shan in the left picture and the rotation stages introducing the twist into the fibre in the right picture.

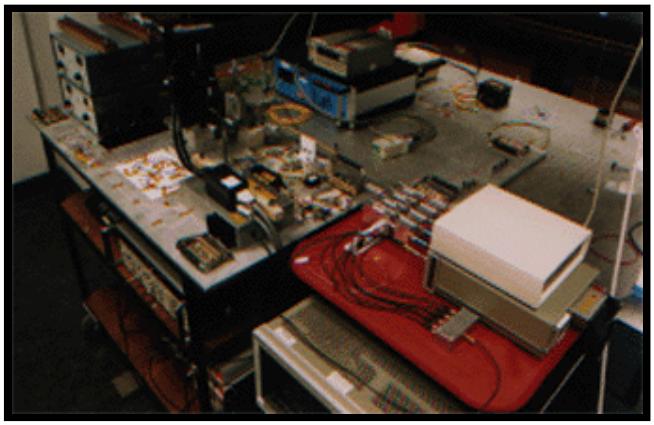


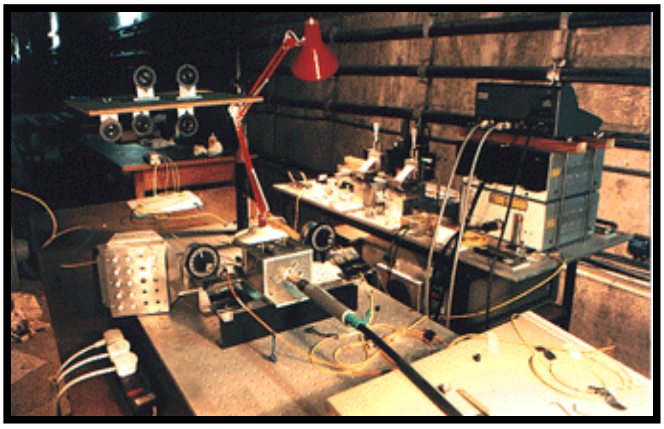

Finally, we started the measurements, as you can see in the left and right pictures. Everything was computer controlled except the twisting, which we had to do manually, but at least it kept us warm and fit. In the right picture, you can see Shan at the far end, John staying on the right and myself sitting in front of the computer.

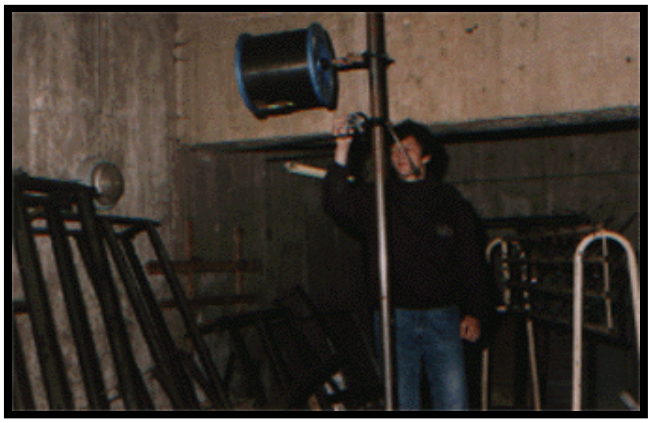
Some more photos of us carrying out some work and posing for photos to remember the good old days in the tunnel.

Then the big time in John's life when he had finished his four channel polarimetric OTDR and it was ready for transport into the tunnel to measure fibres. The right picture shows a top view of John's four channel POTDR where you can just see, on the right corner, the four high speed receivers connected to the polarisation analysing box. By the way, every instrument which survives the tunnel can be said to be very reliable under these harsh conditions and John's instrument did indeed survive the tunnel.

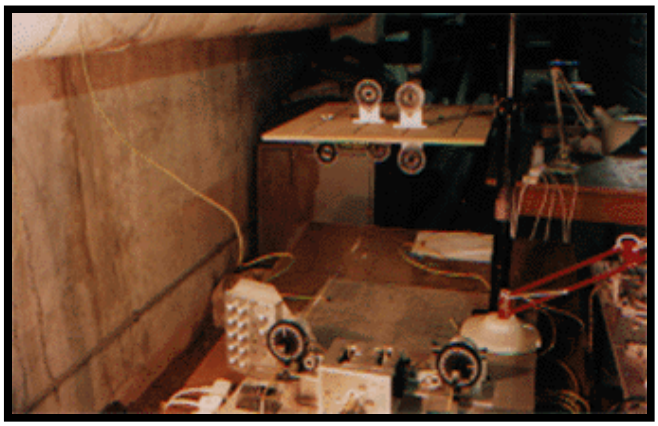


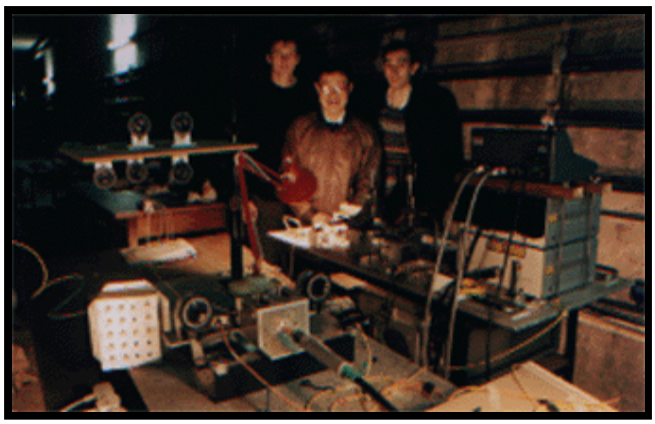


In the left picture, John's POTDR from the top. This time you can see the polarisation analysing box sitting above the four channel digitising oscilloscope. Finally we also used John's POTDR in the tunnel as you can see in the right picture.



In the left picture, taking a measurement with me twisting the fibre at the far end. In the right photo, the more pleasant work was to sit before the computer and start the measurement.





In the left photo, the important twisting mechanism which was accurately made by Bob. Finally, for remembering our time in the tunnel, a group photo of John, the smiling Shan and myself.

THE TUNNEL

where we often stayed until late into the night
where if summer or winter the temperature is always the same
where we could not find any gold or wine
but instead we could find some useful equations

where we unwound and spliced so infinite fibres
where we kept ourselves hot by twisting the fibre
where some fibre broke because the twist was too high
where we broke so many twisting world records
where we twisted the fibre until it told us the truth

where sometimes we could not go out because they locked us in
where the rust seems to be faster than time and time reversal does not apply
where the mice and rats said good night to us
where we had our peace but now I have to leave
which will be the place we always will remember in our dreams

I dedicate the above to Liam Gleeson for sharing so many useful discussions on PMD and penalties, and to John Ellison and Xuekang Shan, for remembering the time spent together in that famous Essex tunnel.