

## Web-based experiments in physics and chemistry

### Summary

Experiments are being developed which can be accessed remotely by students at schools and colleges. These experiments, which are interactive and allow users to communicate with real equipment (not simulations) through the Internet, are intended to enhance a range of courses in the physical sciences.

**Subject area:** Physical Science

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### Description

The project is intended to expand the range of experiments which can be carried out by students in schools, colleges and Universities by allowing access to equipment which cannot be provided in the students' home institutions.

### Type of activity

Remote experiments are being developed. These will be available with on-line instructions designed to allow stand-alone experiments to be run. In addition, detailed descriptions of the equipment and how it may be used will be available for students (and teachers) wishing to design and run their own experiments. We also intend to develop generic software to be made available to interested users in educational institutions so that they can place equipment on the Internet in a relatively straightforward fashion.

### Content covered

Content will depend upon perceived need. At present we have a small optical rig available which generates data for use in an "analysis of errors" experiment. Collaborators in schools are being sought to provide input into experiments which would be of help in illustrating A-level and pre-A-level courses.

### Application

1. To expand the range of experiments which can be covered as part of school and college science courses.
2. To provide remote access to experiments for students unable to complete a normal laboratory course.
3. To allow Universities and schools to minimize costs by sharing experiments which would otherwise be duplicated across several institutions.

### Further comments

This project has developed from a long-standing Internet-based experiment at Oxford University. In view of the financial pressures which all types of educational institutions now experience, the provision of some experiments *via* the Internet would appear to be a cost-effective way of allowing students to tackle experiments which require sophisticated or expensive equipment. Although the Internet was not designed as a medium to run experiments, it has become progressively better suited to this

purpose as the speed of connections has increased. The software problems of connecting equipment are mainly independent of the type of equipment, and a major feature of this project is the aim of creating software which could be used by relatively inexperienced teachers to link equipment to the net. Although we feel it would be very undesirable to replace all practical elements of a science course with web-based experiments, the opportunity to enhance and expand an existing course by using remote experiments is one which we feel that many teachers would welcome.

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