Internet-based Experiments: Challenges and opportunities in science teaching

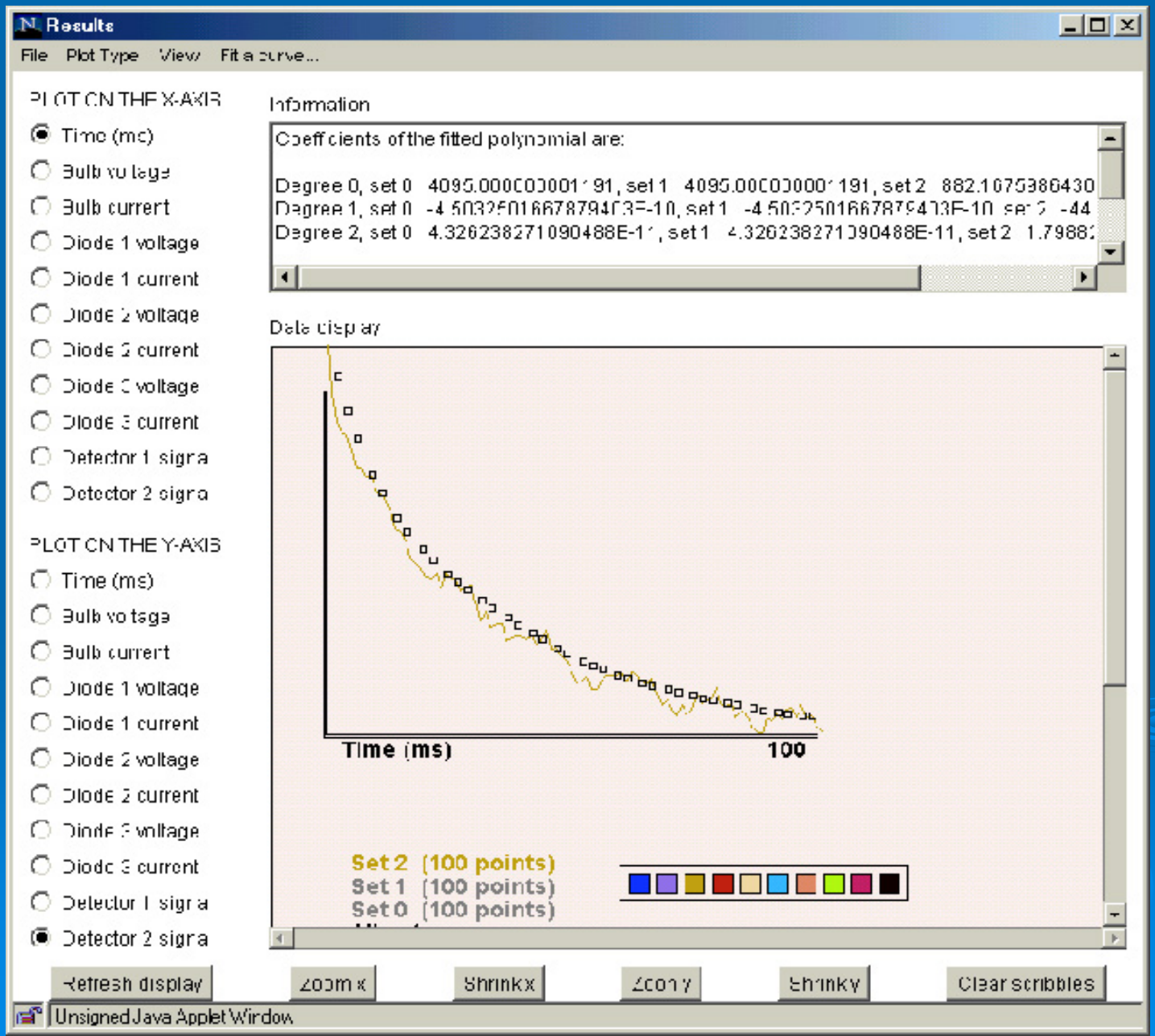
Hugh Cartwright

Chemistry Department,
Oxford University, U.K.

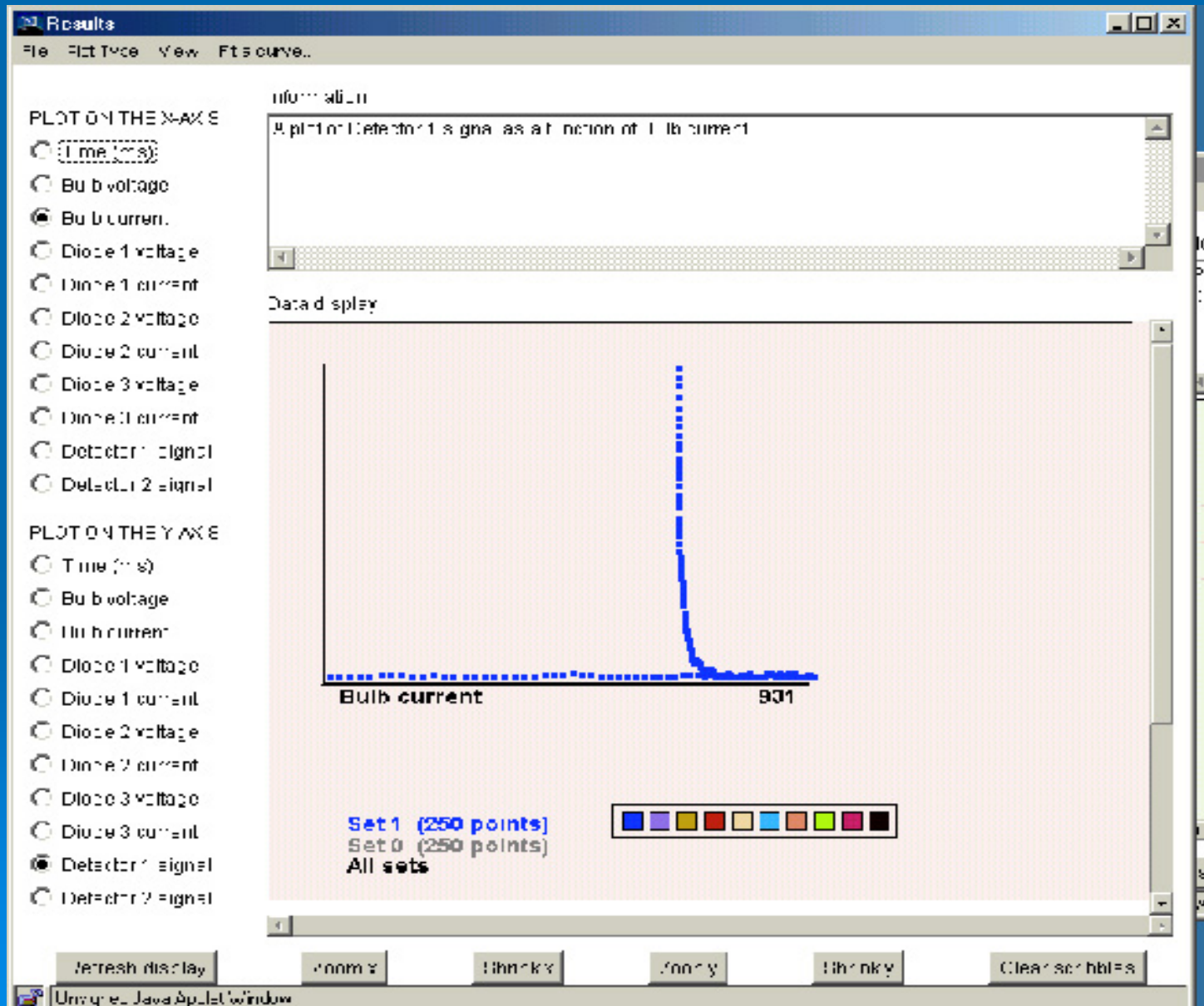
Hugh.Cartwright@chem.ox.ac.uk

What is an online experiment?

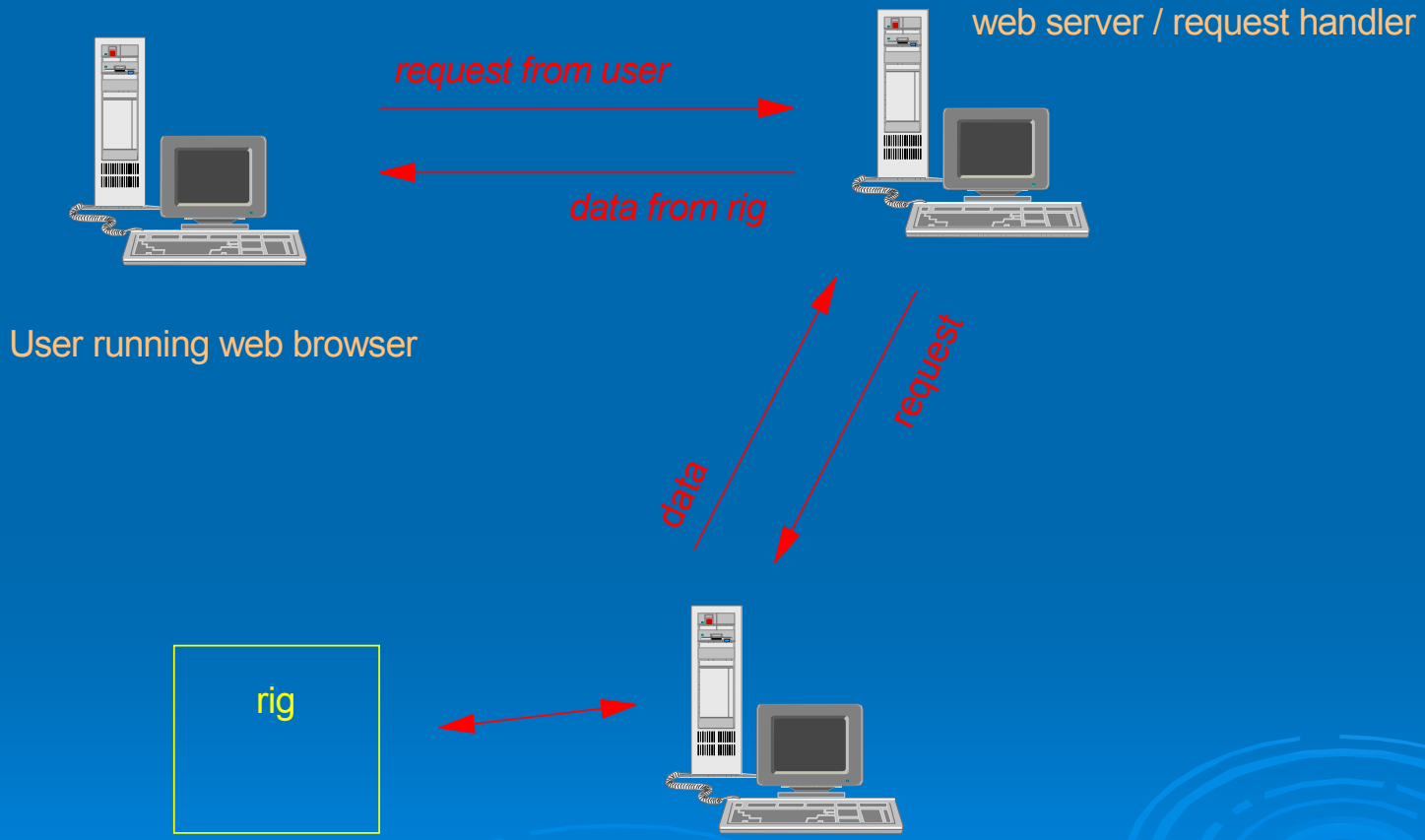
Phosphorescent Decay



Light output as a function of current



On-line Experiments: Typical Hardware Configuration



Software

- Web browser interface
- Server to handle incoming requests
- Job queues
- Reusable software modules
- Equipment control

Advantages of On-line Experiments

- Access for distance learners
- Increased equipment efficiency
- Access to dangerous/exotic environments, expensive/rare equipment
- Engagement of young students in science
- Sharing of facilities between institutions
  - Broaden practical courses
  - Illustrate lectures and classes more effectively
  - Save money!
  - Co-operative experiments

Challenges

- Access blocked by a single user
- Contention
- Malicious / recreational use
- Implementation (Software / hardware)
- Cost

The future

- Distributed experiments for…
  - Distance learning
  - Improved efficiency
  - University and school collaboration
  - Reduced cost
- Automated development of databases
- New areas of research
- Intelligent monitoring of experiments

How should you proceed?

- Draw up goals
- Identify potential partners
- Identify the resources required
- Get funding!!! (but this step might be avoided…)
- Be ambitious

- Hugh.Cartwright@chem.ox.ac.uk