# Molecular Physics Research Group

Hello, my name is Chris Mayhew, and welcome to the web pages of the **Molecular Physics Group**. I have been leading the Molecular Physics Group at the University of Birmingham since 1990. On these pages you will find information about our research interests and details about members of the group.

- **Group members (/research/activity/physics/quantum/molecular/members.aspx)**
- **Instrumentation (PDF 3.73 MB) (/Documents/college-eps/physics/molecular/WEBSITE2009PTRaddition2b.pdf)**
- **Collaborations (PDF 34 KB) (/Documents/college-eps/physics/molecular/Collaboration2.pdf)**
- **Contact (/research/activity/physics/quantum/molecular/contact-us.aspx)**

## General Interests

Our research is directed towards the study of the reactions of electrons and ions with neutral molecules at low energies. As well as its fundamental aspects, the research has important applications to the physics and chemistry of naturally occurring plasmas (e.g. the terrestrial atmosphere), industrial plasmas (e.g. surface etchant plasmas), and pollutant monitoring.

## Applications to Plasmas

Plasmas are complex physical and chemical environments, in which many parallel and sequential ion and electron attachment reactions occur. A basic understanding of the reaction processes provides information which can be used to tailor the plasma to optimise electron and ion densities to enhance (or even inhibit) the critical reactions involved in many technologies.

## Applications to the Detection of Pollutants in Low Concentrations

Monitors used to detect and distinguish one pollutant from another, in what is frequently a complex chemical environment, rely heavily on their sensitivity and selectivity. In the field of environmental pollutant monitors, gaseous ions and electrons are of considerable importance because of their ability to act as powerful probes of neutral trace gases via ion/electron-molecule reactions. An understanding of the underlying ionic processes operating in modern day monitors would make them far more flexible and more useful.



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