New directions in molecular scattering

Small, typically three-atom, systems have been the established bedrock of molecular collision dynamics. The transition to systems of more practical interest involving greater complexity presents profound conceptual and practical challenges to the established 'state-to-state' philosophy. Improved experimental and theoretical capabilities enable the study of scattering systems more typical of real-world applications, and also offer the ability to probe processes in extreme environments. However, many of these approaches are still able to exploit the benefits of quantum-state preparation, stereochemical control of reactants, and detailed characterisation of products typical of studies in smaller systems. Looking beyond the conventional near-thermal regime, studies at successively lower translational energies have emerged as a major topical area, and there is also increasing interest in studying processes at very high collision energies, typical of ionised systems. The shift in focus towards more complex systems also applies to collisions of gas-phase molecules with condensed-phase surfaces. Such collisions are widespread in diverse environments extending from atmospheric chemistry, through heterogeneous catalysis, to biological respiration, but despite their obvious applicability they have been much less well studied than bimolecular collisions in the gas phase

In this volume the topics covered include:

- Manipulation and control of translational energy or stereochemistry of collision partners
- Scattering in extreme environments
- Scattering of larger molecules
- Organic thermoelectrics
- Scattering at condensed-phase surfaces

Front cover image: Above: F projectile, 1 target and 3 pivot, Below: F projectile, 3 target and 1 pivot

Faraday Discussions

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