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## Preface to Molecular Rydberg dynamics, the published proceedings of a Discussion

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## Preface

Molecular Rydberg states, which were first recognized as a distinct class by W. C. Price and R. S. Mulliken in the 1930s, have special characteristics associated with the convergence of any series towards an ionization limit. They are extremely diffuse, highly polarizable and inappropriate for any conventional Born–Oppenheimer spectroscopic analysis. The following contributions to the Royal Society Discussion Meeting held in November 1996 broadly summarize our present state of knowledge.

States may be classed as cometary or planetary in character. The former involve strong but brief ( $\tau \sim 1$  fs) encounters with the molecular ion core, leading perhaps to electron ejection (autoionization) or molecular fragmentation (predissociation), both of which may be of atmospheric or astrophysical interest. Theoretical multichannel quantum defect techniques have been specifically refined over the years to take these cometary characteristics into account. The nature of the planetary states has also excited attention, even controversy, in recent years in the context of ZEKE (zero electron kinetic energy) spectroscopy because their long lifetimes ( $\tau \sim 1$   $\mu$ s), which have valuable experimental implications, can be explained only on a non-penetrating basis. Contributions to the Discussion go a long way towards resolving the controversy.

I acknowledge the work of colleagues on the organizing committee: Jim Watson, Bob Field and in particular Dolores Gauyacq for organizing the poster session. The organizers are also grateful to all contributors for prompt submission of their manuscripts and to the staff of the Royal Society for their organizational and publishing support.

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