

# Research on hydrogen bonded molecular clusters: HF-clusters

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Resonance-Enhanced-Multiphoton-Ionisation (REMPI) is a method which uses a high intensity laser to ionize molecules from their excited states. When the molecule is hit by the laser it can absorb a number of photons to be promoted to an excited state from which it is ionised.

Molecular spectra were gathered using a Time-of-Flight mass analysis of ions following jet cooling (REMPI-TOF). Spectra of HF gas for the wavenumbers 86000–91000  $\text{cm}^{-1}$  was measured with the above method. For the first time excited states of the HF clusters, that form during jet cooling, were measured. These states belong to the  $(\text{HF})_2$ ,  $(\text{HF})_3$ ,  $(\text{HF})_4$  ... etc. clusters of the HF molecule. A quantum simulation program was used to identify the  $(\text{HF})_2$  state, and other experiments suggested that the origin of the other states were from higher clusters.