EXPERIMENTAL ELECTRONIC SPECTROSCOPY OF TWO PAHs: NAPHTHALENE AND 2-METHYL NAPHTHALENE

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The presence of polycyclic aromatic hydrocarbons (PAHs) in the interstellar medium (ISM) was suggested in the mid-80s. Since then, their important role in the physico-chemical evolution of the ISM has been confirmed. Interstellar PAHs have been in particular proposed as possible carriers of some Diffuse Interstellar Bands (DIBs). These absorption bands are seen in the spectra of reddened stars from the visible to the near infrared and constitute a major astrophysical issue. Our purpose is to obtain electronic spectra of gas phase PAHs which will be used to probe their participation to the interstellar extinction curve from the visible (DIBs) to the UV (bump). For this goal PAHs cations represent an excellent set of target species. A new way of forming PAH$^+$-Ar$_n$ clusters cations has been implemented in the experimental set-up 'ICARE' at ISMO (Orsay) giving us the capability to measure the electronic spectra of cold PAH cations in the gas phase through the Ar tagging trick. Two molecules have been investigated in this way: naphthalene ($C_{10}H_8$) and 2- methyl naphthalene ($C_{11}H_{10}$). Clusters of naphthalene and (or 2-methyl-naphthalene) with Ar atoms are first formed in a supersonic jet, before being hit by a 281 nm laser beam which photo-ionizes the clusters which are then injected in a molecular beam through a skimmer. A tunable laser beam crossing downstream photo-dissociates the cations. The bare PAH fragments are detected using a Time-Of-Flight spectrometer while scanning the visible laser wavelength from 470 to 690 nm.