

The presence of hydrocarbons, polycyclic aromatic hydrocarbons (PAH) and fullerenes in the interstellar media (ISM) have opened astronomers and astrophysicists whole new fascinating field of research opportunities. It is estimated that PAHs may constitute one of the largest groups of particles and incorporate from 5 to 20% of the total carbon content of the ISM. Therefore, new fundamental questions arise, eg. how strong are they related with other common components of the ISM. Hydrocarbons or PAH compounds are also present in our everyday life. They have found an applications in many manufacturing processes. Burning of fossil fuels causes the emission of many hydrocarbon compounds into the atmosphere, affecting the environment and human and animal biology. Some also believe that the hydrocarbon compounds may be the carriers of some diffuse interstellar bands (DIB) observed for over 100 years and still being one of the biggest mysteries in modern astronomy.

As a result of the ionization processes in the ISM, hydrocarbon ions could be also present in the ISM. They could strongly interact with other gases through the charge exchange processes, which may be accompanied by fragmentation of primary ions into the smaller components. These ion-molecule collisions will be studied in a laboratory conditions by means of mass and optical spectroscopy. A few keV hydrocarbon ion beams will interact with different gases. The fast ionized and neutral fragmentation products will be energy and mass analyzed in the experiment. Also the collisional induced optical spectra will be analyzed and interpreted giving information about electronically excited products.