PROGRESS OF A NEW INSTRUMENT TO STUDY MOLECULAR DYNAMICS OF INTERSTELLAR ION-NEUTRAL REACTIONS

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Astrochemistry, a relatively young field of research, addresses a gap in our understanding of molecular evolution in space. With many space missions gathering data, the number of unresolved spectral lines is growing rapidly. Each year there are about three new molecules that are identified in the interstellar medium (ISM). However, our understanding of molecular processes, branching ratios, and rates are at a beginner level. For instance, we do not yet understand the chemical processes associated with the creation and evolution of even the most basic molecules such as water and methanol in space. One of the important steps toward understanding the chemistry of the ISM is to identify, through laboratory and theoretical work, a list of potential target molecules that are likely to exist in the ISM. This work describes experimental progress towards building a spectrometer that is able to produce complex cold ions that will react with cooled neutral molecules under conditions similar to those in space. I plan to present the astrochemical needs that motivated my research, how the new instrument will meet those needs, and the present status of the instrument and measurements in my lab.