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## Instrumentation for Determining Prebiotic Species in the Interstellar Medium

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Rudd, Lydia; Lamm, Ben; Roenitz, Kevin; and Perera, Faculty Advisor, Manori,  
"Instrumentation for Determining Prebiotic Species in the Interstellar Medium" (2016).  
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Oral Presentation O6.2

## **INSTRUMENTATION FOR DETERMINING PREBIOTIC SPECIES IN THE INTERSTELLAR MEDIUM**

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We are building an instrument to study the gas phase reaction dynamics of astronomically relevant molecular species, specifically the reactions of ions with neutral molecules. With this instrument, we plan to study the branching ratios of product channels under a variety of temperatures, pressures, and external photon energies that adequately simulate the conditions of the interstellar medium (ISM). The data will allow us to (1) identify new species that are stable under ISM conditions and (2) understand the reaction dynamics of ion-neutral reactions since these are known to drive the chemistry of the ISM. The particular ions – such as  $\text{HCN}^+$ ,  $\text{HCO}^+$  and  $\text{C}_3\text{H}_3^+$  – that we propose to study are important for prebiotic and carbon chemistry in space. The instrument consists of 3 stages: (1) a dual channel ion source (2) a liquid nitrogen cooled ion trap with optional laser and (3) a time-of-flight mass spectrometer. The progress of the instrument will be presented.