MACHINE LEARNING OF THE CHEMICAL INVENTORY AND RARE ISOTOPOLOGUES OF THE SOLAR-TYPE PROTOSTELLAR SOURCE IRAS 16293-2422 B

ZACHARY TAYLOR PHILIP FRIED, *Department of Chemistry, Massachusetts Institute of Technology, Cambridge, MA, USA*; KELVIN LEE, *Accelerated Computing Systems and Graphics, Intel Corporation, Hillsboro, OR, USA*; ALEX BYRNE, BRETT A. McGUIRE, *Department of Chemistry, Massachusetts Institute of Technology, Cambridge, MA, USA*.

Machine learning techniques have been previously used to model and predict column densities in the TMC-1 dark molecular cloud. However, in interstellar sources further along the path of star-formation, such as those where a protostar itself has been formed, the chemistry is known to be drastically different from that of largely quiescent dark clouds. In this talk, I will describe the ability of various machine learning models to fit the column densities of the molecules detected in source B of the Class 0 protostellar binary IRAS 16293-2422. By including a simple encoding of isotopic composition in the molecular feature vectors, I also examine for the first time how well these models can replicate the isotopic ratios. Finally, these trained models provide a list of predicted high-abundance molecules that may be excellent targets for laboratory spectroscopy and subsequent radioastronomical detection in IRAS 16293-2422 B.