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Abstract

Poster

Major: Physics

Faculty Mentor(s): Esteban Araya

Long Term Variability of Methanol Masers in the Orion Nebula

Drew Hecox

In astronomy, masers are naturally occurring amplified stimulated line emission that produce coherent electromagnetic radiation—typically in the microwave range. Masers in high-mass star-forming regions, such as methanol masers, can be used to study the evolutionary stages of massive star formation. Masers in high-mass star-forming regions can exhibit long-term variability, which can be caused by changes in the physical conditions of the environment or by the intrinsic properties of the maser sources themselves. We report results of a search for 6.7 GHz CH₃OH lines toward specific sites in the Orion Nebula known to have previous detections of this line. We are studying Orion as part of the VOLS project (VLA Orion A Large Survey), which is an international collaboration using the NRAO Very Large Array in New Mexico to survey the Orion Nebula. We identified a 6.7 GHz CH₃OH maser at a location where a maser was detected in 2003 and 2004. However, the maser is approximately 5 times brighter than previously reported, which confirms variability of CH₃OH masers in the region. We also report non-detection of extended 6.7 GHz CH₃OH emission that was previously reported in the literature. We found that the non-detection can be explained by the lack of short baselines from the VOLS data. This work is based on observations conducted by the VOLS collaboration (P.I. G. Busquet Rico).