

Abstract Submitted
for the PSF15 Meeting of
The American Physical Society

A Study of 6.7 GHz Methanol Absorption toward the Star Forming Region G45.12+0.13 WEI SIANG TAN, ESTEBAN D. ARAYA, Physics Department, Western Illinois University, LI EAN LEE, University of Missouri Columbia — The methanol line at a rest frequency of 6.7 GHz is commonly found in massive star-forming regions. This transition is mostly detected in emission, but absorption has also been observed against ionized clouds. As part of a survey for molecular lines conducted with the 305m Arecibo Telescope, we detected 6.7 GHz methanol absorption toward the massive star-forming region G45.12+0.13. The aim of this project is to study the physical conditions needed to explain the observed absorption line. We used the radiative transfer codes MolPop and Radex to investigate the physical conditions of the molecular cloud responsible for the absorption. We explored whether the line is caused by absorption of Cosmic Microwave Background (CMB) radiation. We were able to reproduce the level of absorption if the molecular cloud is as extended as the telescope beam, however, the model shows that the molecular cloud would have an unreasonable 3-dimensional aspect ratio. On the other hand, if the molecular cloud is significantly smaller than the telescope beam, there would not be enough CMB photons to explain the absorption. Thus, we conclude that the 6.7 GHz methanol absorption detected toward G45.12+0.13 is not caused by CMB absorption, but by absorption against the radio continuum.

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Date submitted: 16 Oct 2015

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