Abstract Submitted
for the OSS14 Meeting of
The American Physical Society

A Computational and Observational Investigation of Interstellar Thioformaldehyde[1] LISA SIMPSON, IAN HOFFMAN, Wittenberg University — Interstellar spectroscopy of thioformaldehyde (H_2CS) holds substantial promise because of the close relationship between the H_2CS molecule and the well-studied formaldehyde (H_2CO) molecule. We present here a summary of our computational investigation of H_2CS level populations and their relationship to known H_2CO masers. The details of a recent observational search for emission and absorption of four H_2CS isotopologues will also be discussed. The nonthermal pump model developed by Boland and de Jong (1981) for the 4.8-GHz (J=1) transition of H_2CO has been updated and extended to both the analogous ground state transition and the J=2 transition of four thioformaldehyde isotopologues. Preliminary results from our model suggest the possibility of nonthermal maser emission from any of these isotopologues at either transition. Using the Green Bank Telescope, we performed the first search of the Galactic star-forming region NGC 7538 for thermal and nonthermal emission and absorption at the J=1 level from all of the considered isotopologues. Although the search did not result in a detection of the elusive J=1 line of H_2CS, it has provided the most sensitive upper-limit to date for the sulfur-to-oxygen ratio in this important region.

[1]This work is supported by the Wittenberg University Physics Department and the Student Development Board.

Lisa Simpson
Wittenberg University

Date submitted: 14 Mar 2014 Electronic form version 1.4