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High resolution infrared and microwave spectra of OCS solvated in helium clusters. WOLFGANG JAEGER, University of Alberta, ROBERT MCKELLAR, National Research Council of Canada, YUNJIE XU, University of Alberta — In recent years, exciting progress has been made in determining the onset and following the evolution of a bulk phase property, namely superfluidity, in the microscopic size regime. Our previous microwave and infrared studies of small He_N-OCS and He_N-N_2O clusters extended up to N=8 and N=19, respectively, and the infrared spectra with CO or CO_2 as probe reached almost up to N=20. We have now been able to extend the studies on He_N-OCS to much larger N-values in both the infrared and microwave regions. The B rotational constants that were extracted from the spectra show unexpected, non-classical behavior as a function of N, the number of helium atoms. We will present the experimental techniques used and an interpretation of the observed trends in spectroscopic observables.

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