THE EFFECTIVE HAMILTONIAN FOR THE GROUND STATE OF $^{207}Pb^{19}F$ AND NEW MEASUREMENTS OF THE FINE STRUCTURE SPECTRUM NEAR 1.2 μm.

RICHARD MAWHORTER, BENJAMIN MURPHEY, ALEXANDER BAUM, *Department of Physics and Astronomy, Pomona College, Claremont, CA 91711*; TREVOR J. SEARS, *Chemistry Department Brookhaven National Laboratory, Upton, NY 11973 and Stony Brook University, Stony Brook, NY 11794*; T. ZH. YANG, P. M. RUPASINGHE, C. P. MCRAVEN[a], N. E. SHAFER-RAY, *Homer L. Dodge Department of Physics and Astronomy, University of Oklahoma, Norman, OK*; LUKAS D. ALPHEI AND JENS-UWE. GRABOW, *Gottfreid-Wilhelm-Liebniz-Universität, Institut für Physikalische Chemie & Elektrochemie, D-30167 Hannover, Germany*.

We have measured rotational transitions in the ground, $X_1\ ^2\Pi_{1/2}$, electronic state of naturally occuring isotopomers of PbF in a supersonic free jet Fourier transform microwave spectrometer. The data for $^{207}Pb^{19}F$ is particularly interesting because it is a candidate for a future experimental e-EDM measurement. To fit the data for this species to the measurement precision, the nuclear spin-spin dipolar interaction and a second term that can be equivalently viewed as a centrifugal distortion correction to the familiar Frosch and Foley hyperfine coupling terms, or an $\Omega-$ dependent correction to the nuclear spin-rotational coupling are required, in addition to the standard terms. To characterize the higher $X_2\ ^2\Pi_{3/2}$ component of the ground state of PbF, we are attempting a direct measurement of transitions between the two components in a slit jet-cooled sample using a frequency comb-referenced extended cavity diode laser. This spectrum was originally detected in a hot source by Fourier transform near-infrared spectroscopy,[b] but low$-J$ transitions were unresolved at that time.

Acknowledgments: Work at Brookhaven National Laboratory was carried out under Contract No. DE-AC02-98CH10886 with the U.S. Department of Energy. Work by N. E. Shafer-Ray was performed with support from the National Science Foundatation award NSF-0855431. J.-U. Grabow ackonwledges funding from the Deutsche Forschungsgemeinschaft and the Land Niedersachsen.

[a] Current Address: Chemistry Department, Brookhaven National Laboratory, Upton, NY 11973

[b] K. Ziebarth, K. Setzer, O. Shestakov and E. Fink *J. Molec. Spectrosc.* **191**, 108 1998.