Publication List

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Submitted and Peer-reviewed Articles

38. Timothy C. Steimle, Damian L. Kokkin, Yongrak Kim, Richard J. Mawhorter, & Colan Linton, *Characterization of the [18.42]$0^+ - X^1\Sigma^+(0,0)$ Band of Tantalum Nitride*, *TaN*, Chemical Physics Letters **664**, 138–142 (2016).

37. Jacob L. Bouchard, Timothy Steimle, Damian L. Kokkin, David J. Sharfi and Richard J. Mawhorter, *Branching Ratios, Radiative Lifetimes, and Transition Dipole Moments for Tantalum Nitride, TaN*, Journal of Molecular Spectroscopy **325**, 1-6 (2016).

36. L. F. Pašteka, R. J. Mawhorter, and P. Schwerdtfeger, *Dirac-Hartree-Fock Coupled-Cluster Calculations of the ^{173}Yb Nuclear Quadrupole Coupling Constant for the YbF Molecule*, Molecular Physics **114**, 1110-1117 (2016).

35. L.V. Skripnikov, A.N. Petrov, A.V. Titov, R.J. Mawhorter, A.L. Baum, T.J. Sears, and J.-U. Grabow, *Further investigation of g-factors for lead monofluoride ground state, PbF*, Physical Review A **92**, 032508 (2015).

34. J. Machacek, D. P. Mahapatra, D. R. Schultz, Yu. Ralchenko, A. Chutjian, J. Simcic, S. M. Madzunkov, and R. J. Mawhorter, *Measurement and Calculation of Absolute Single and Double Charge Exchange Cross Sections for O^{6+} Ions at 1.17 keV/u and 2.33 keV/u Impacting He and H_2*, Physical Review A **90**, 052708 (2014).

33. Zachary Glassman, Richard Mawhorter, Jens-Uwe Grabow, Anh Le, and Timothy C. Steimle, *The microwave spectrum of the odd isotope of ytterbium fluoride, ^{171}YbF*, Journal of Molecular Spectroscopy **300**, 7-11 (2014). (Contribution to special issue on "Molecular Spectroscopy Tests of Fundamental Physics")

32. Philip D. McCaffrey, David W.H. Rankin, Derek A. Wann, Jan M.L. Martin, & Richard J. Mawhorter, *Equilibrium Gas-Phase Structures of Sodium Fluoride, Bromide and Iodide Monomers and Dimers,* Journal of Physical Chemistry A **118**, 1927 (2014).

31. A.N. Petrov, L.V. Skripnikov, A.V. Titov and R. J. Mawhorter, *Centrifugal correction to hyperfine structure constants in the ground state of lead monofluoride, PbF,* Physical Review A **88**, 010501 (Rapid Communications) (2013).

30. R. J. Mawhorter, J. B. Greenwood, A. Chutjian, T. Haley, C.D. Mitescu, and J. Simcic,

Measurement of absolute charge exchange cross sections for He^{2+} collisions with He and H_2, Physical Review A **84**, 052714 (2011).

29. Richard Mawhorter, Benjamin Murphy, Alexander Baum, Trevor J. Sears, T. Zh.Yang, P.M. Rupasinghe, C.P. McRaven, N.E. Shafer-Ray, Lukas D. Alphei and Jens-Uwe Grabow, *Characterization of the Ground X_1 State of $^{204}Pb^{19}F$, $^{206}Pb^{19}F$, $^{207}Pb^{19}F$, and $^{208}Pb^{19}F$*, Physical Review A **84**, 022508 (2011).

28. Lukas D. Alphei, Jens-Uwe Grabow, A.N. Petrov, Richard Mawhorter, Benjamin Murphy, Alexander Baum, Trevor J. Sears, T. Zh.Yang, P.M. Rupasinghe, C.P. McRaven, and N.E. Shafer-Ray, *Precision Spectroscopy of the $^{207}Pb^{19}F$ molecule: implications for measurement of* P−*odd and* T−*odd effects*, Physical Review A **83**, 040501 (Rapid Communications) (2011).

27. J. Simcic, D.R. Schultz, R. J. Mawhorter, , J. B. Greenwood, C. Winstead, B.V. McKoy, S. J. Smith, and A. Chutjian, *Measurement and Calculation of Absolute Single and Multiple Charge Exchange Cross Sections for Fe^{q+} Ions Impacting H_2O*, Astrophysical Journal **722**, 435-439 (2010).

26. J. Simcic, D. R. Schultz, R. J. Mawhorter, I. Čadež, J. B. Greenwood, A. Chutjian, C. M. Lisse, and S. J. Smith, *Measurement of absolute single and multiple charge exchange cross sections for Fe^{q+} ions impacting CO and CO_2*, Physical Review A **81**, 062715 (2010).

25. P. D. McCaffrey, J. K. Dewhurst, D. W. H. Rankin, R. J. Mawhorter and S. Sharma, *Inter-atomic contributions to high-energy electron-molecule scattering,* J. Chem. Phys. **128**, 204304 (2008).

24. Philip D. McCaffrey, Richard J. Mawhorter, Andrew R. Turner, Paul T. Brain, David W. H. Rankin *Accurate Equilibrium Structures Obtained from Gas-Phase Electron Diffraction Data: Sodium Chloride,* Journal of Physical Chemistry A **111**, 6103-6114 (2007).

23. R. J. Mawhorter, A. Chutjian, T. E. Cravens, N. Djurić, S. Hossain, C. M. Lisse, J. A. MacAskill, S. J. Smith, J. Simcic, and I. D. Williams, *Absolute single and multiple charge exchange cross sections for highly-charged C, O, and Ne ions on CO, CO_2, and H_2O*, Physical Review A **75**, 032704 (2007).

22. H. Fleischer, D. A. Wann, S. L. Hinchley, K. B. Borisenko, J. R. Lewis, R. J. Mawhorter, H.E. Robertson and D. W. H. Rankin, *Molecular Structures of $Se(SCH_3)_2$ and $Te(SCH_3)_2$ using Gas-phase Electron Diffraction and* Ab initio *and DFT Geometry Optimisations*, Dalton Trans. **2005**, 3221-3228 (2005).

21. Job D. Cardoza, Raymond C. Dudek, Richard J. Mawhorter, and Peter M. Weber, *Centering of Ultrafast Time-Resolved Pump-Probe Electron Diffraction Signals*, Chemical Physics **299**, 307-312 (2004).

20. J. B Greenwood, R.J. Mawhorter, I. Čadež, J. Lozano, S.J. Smith, & A. Chutjian, *The Contribution of Charge Exchange to Extreme Ultra-Violet and X-ray Astronomy*, Physica Scripta, **T110**, 358-363 (2004).

19. I. Čadež, J.B. Greenwood, J. Lozano, R.J. Mawhorter, M. Niimura, S.J. Smith, & A. Chutjian, *Absolute Cross Sections for Single and Double Charge-Exchange in* Fe^{q+} *Impacting on He*, J. Phys.B: At. Mol. Opt. Phys. **36**, 3303-3314 (2003).

18.I. Cadez, J.B. Greenwood, A. Chutjian, R.J. Mawhorter, S.J. Smith, & M. Niimura, *Absolute Cross Sections for Charge-Exchange in* $^3He^{2+}$ *and* H^+ *Impact on CO*, J. Phys. B: At. Mol. Opt. Phys. **35**, 2515-2524 (2002).

17.Sarah L. Hinchley, Bruce A. Smart, Carole Morrison, Heather E. Robertson, David. W. H. Rankin, Robert A. Coxall, Simon Parsons, Robert Zink, Karl Hassler and Richard Mawhorter, *Molecular Structure of* $Bu^tCl_2SiSiCl_2Bu^t$ *in the Gas Phase by Electron Diffraction and* Ab Initio *Calculations*. *Molecular Structures of the Compounds* $Bu^tX_2SiSiX_2Bu^t$ *(X = Cl, Br or I) by Vibrational Spectroscopy, X-ray Crystallography and* Ab Initio *Calculations*, J. Chem. Soc., Dalton Trans. **2001**, 2916-2925 (2001).

16.Amalie L. Frishknecht and Richard J. Mawhorter, *The Anharmonic Bending Vibration of the NaCl Dimer*, Molecular Physics **93**, 583-592 (1998).

15.R.J. Mawhorter, R.J. Cave, C.R. Pulham, S. Biermann, J. Hoeft, & T. Törring, *A Harmonic Potential Function for Lithium Sodium Difluoride,* $LiNaF_2$, Journal of Molecular Structure **413-414**, 415-422 (1997).

14.S. Biermann, J. Hoeft, T. Törring, R. Mawhorter, F.J. Lovas, R.D. Suenram, Y. Kawashima, & E. Hirota, *Microwave Spectroscopy of Mixed Alkali Halide Dimers:* $LiNaF_2$, Journal of Chemical Physics **105**, 9754-9761 (1996).

13. T. Törring, S. Biermann, J. Hoeft, R. Mawhorter, R.J. Cave, & C. Szemenyei, *The Structure of Alkali Halide Dimers: A Critical Test of Ionic Models and New* Ab Initio *Results,* Journal of Chemical Physics **104**, 8032-8042 (1996).

12. Richard J. Mawhorter, David W.H. Rankin, Heather E. Robertson, Malcolm L.H. Green & Peter Scott, *A Gas-Phase Electron Diffraction Study of the Molecular Structure of (η-Cycloheptatrienyl)(η-cyclopentadienyl)niobium,* $Nb(\eta\text{-}C_7H_7)(\eta\text{-}C_5H_5)$, Organometallics **13**, 2401-2404 (1994).

11. Steven J. Smith, A. Chutjian, J. Mitroy, S.S. Tayal, Ronald J.W. Henry, K-F. Man, R.J. Mawhorter, and I.D. Williams, *Excitation Cross Sections for the* $ns\ ^2S \rightarrow np\ ^2P$ *Resonance Transitions in* Mg^+ *(n=3) and* Zn^+ *(n=4) Using Electron-Energy-Loss and Merged-Beams Methods*, Physical Review A **48**, 292-309 (1993).

10. Steven J. Smith, A. Chutjian, R.J. Mawhorter, and I.D. Williams, *Excitation of Positive Ions by Low-Energy Electrons: Relevance to the Io Torus*, Journal of Geophysical

Research **98:E3**, 5499-5505 (1993).

9. Robert P. Dickey, David Maurice, Robert J. Cave, and Richard Mawhorter, *A Theoretical Investigation of the Geometries, Vibrational Frequencies, and Binding Energies of Several Alkali Halide Dimers*, Journal of Chemical Physics **98**, 2182-2190 (1993).

8. Steven J. Smith, K-F. Man, R.J. Mawhorter, I.D. Williams, and A. Chutjian, *Absolute, Cascade-Free Cross Sections for the $^2S \rightarrow {}^2P$ Transition in Zn^+ Using Electron Energy-Loss and Merged-Beams Methods*, Physical Review Letters **67**, 30-33 (1991).

7. I.D. Williams, A. Chutjian, and R.J. Mawhorter, *Differential Electron Scattering Cross Sections for the First Optically Forbidden and Resonance Transitions in MgII, ZnII, and CdII*, Journal of Physics B: Atomic and Molecular Physics **19**, 2189-2198 (1986).

6. M. Breitenstein, R.J. Mawhorter, H. Meyer, and A. Schweig, *Vibrational Effects on Electron-Molecule Scattering for Polyatomics in the First Born Approximation: H_2O*, Molecular Physics **57**, 81-88 (1986).

5. R.J. Mawhorter, M. Fink, and J.G. Hartley, *An Electron Diffraction Study of Alkali Chloride Vapors*, Journal of Chemical Physics **83**, 4418-4426 (1985).

4. M. Breitenstein, R.J. Mawhorter, H. Meyer, and A. Schweig, *Theoretical Study of the High Energy Electron Scattering Cross Sections of CO_2*, Physical Review Letters **53**, 2398-2401 (1984).

3. R. Mawhorter & M. Fink, *The Vibrationally Averaged, Temperature-Dependent Structure of Polyatomic Molecules. II. SO_2*, Journal of Chemical Physics **79**, 3292-3295 (1983).

2. Péter Pulay, Richard Mawhorter, D.A. Kohl and M. Fink, Ab Initio *Hartree-Fock Calculation of the Elastic Electron Scattering Cross Section of Sulphur Hexafluoride*, Journal of Chemical Physics **79**, 185-191 (1983).

1. R.J. Mawhorter, M. Fink and B.T. Archer, *The Vibrationally Averaged, Temperature-Dependent Structure of Polyatomic Molecules. I. CO_2*, Journal of Chemical Physics **79**, 170-174 (1983).

<u>Conference Proceedings</u>

1. M. Fink, T.J. Gay, & R. Mawhorter, *Energy Calibration of the Texas Neutrino Mass Experiment (NEXTEX) by Electron Diffraction,* Nuclear Physics B (Proc. Suppl.) **118**, 485 (2003).