

Shanshan Yu

Shanshan.Yu@jpl.nasa.gov

Jet Propulsion Laboratory, M/S 183-301, 4800 Oak Grove Drive, Pasadena, CA 91109

Tel: (818) 354-5829, (626) 688-0284

EDUCATION:

- **Ph.D. in physical chemistry, Chemistry department, University of Waterloo, Waterloo, Canada, Sept. 2003-April 2007**
Supervisor: Professor Peter Bernath
Thesis title: High-resolution laboratory spectroscopy of transient metal-containing molecules
Courses taken: Spectroscopy, Atmospheric remote sensing, Chemical instrumentation, Quantum chemistry, Theory and practice of computational chemistry (GPA: 94.6/100)
- **M.Sc. in optics, Physics department, East China Normal University, Shanghai, China, Sept. 2000-July 2003**
Supervisor: Professor Yangqin Chen
Thesis title: Study of hot bands of the $B^2\Sigma_u^+ - X^2\Sigma_g^+$ system of C_2^- anion by optical-heterodyne magnetic-rotation enhanced velocity modulation spectroscopy
- **B.Eng. in optoelectronics, Physics department, East China Normal University, Shanghai, China, Sept. 1996-July 2000**

RESEARCH INTERESTS:

- Submillimeter/terahertz spectroscopy of atmospheric and astrophysical molecules and ions
- Infrared Fourier transform spectroscopy of atmospheric and astrophysical molecules and ions
- Visible laser excitation spectroscopy of atmospheric and astrophysical molecules and ions
- Remote sensing of astrophysical molecules and ions

RESEARCH EXPERIENCE:

- **Research Scientist at Jet Propulsion Laboratory, Jan. 2010-Present**
 - Research topic 1: laboratory submillimeter/terahertz spectroscopy of gaseous molecules and ions
 - Research topic 2: Data analysis of astrophysical observations by Herschel
- **NASA postdoctoral scholar at Jet Propulsion Laboratory, advisor Dr. Brian Drouin, Mar. 2008-December 2009**
 - Research topic 1: laboratory submillimeter/terahertz spectroscopy of gaseous molecules and ions for Herschel, SOFIA and ALMA
 - Goal: providing new or improved molecular parameters for potential and known interstellar species

- Recorded the spectra of H_3O^+ , C_2D_2 , C_2H_2 , CH_3NH_2 , NH_3 and O_2 with a terahertz spectrometer
 - Modeled the observed H_3O^+ , C_2D_2 , C_2H_2 transitions together with prior available infrared data
 - Parameterized the quantum mechanical Hamiltonian for CH_3NH_2 , NH_3 and O_2
 - Participated in the design and fabrication of a new plasma generating system for ions
 - Constructed a new extended negative glow discharge system for generating ions
- Research topic 2: extensive isotopic measurements of common interstellar molecules for the Herschel Phase E laboratory studies project
 - Goal: providing new spectroscopic measurements of these molecules in the 0.2-1.6 THz region
 - Constructed two specially designed static quartz cells for the experiments
 - Recorded terahertz spectra of CH_3OH , HCOOCH_3 , CH_3OCH_3 , $\text{CH}_3\text{CH}_2\text{CN}$ and their isotopologues
- Research topic 3: analysis of astrophysical spectroscopic observations
 - Goal: identifying interstellar species and study their physical and chemical environments
 - Identified species in G19, a complex high-mass star formation region
- **Graduate research assistant and postdoc for Dr. Takayoshi Amano, University of Waterloo, Oct. 2006-November 2007**
 - Research topic: submillimeter-wave spectroscopy of HCO^+ and DCO^+
 - Synthesized HCO^+ and DCO^+ with an extended negative glow discharge
 - Recorded pure rotational spectra of HCO^+ and DCO^+ in the excited vibrational states
- **Graduate research assistant for Dr. Peter Bernath, University of Waterloo, Sept.2003-April 2007**
 - Research topic 1: Fourier transform infrared and near-infrared emission spectroscopy of metal-containing molecules
 - Synthesized SbH , SbD , TeH , TeD , CdH_2 , CdD_2 and HZnCl in the gas phase using a high temperature tube furnace with an electrical discharge. Synthesized CoS and NiS in the gas phase using a carbon tube furnace (King furnace)
 - Recorded their emission spectra using a Bruker IFS 120 HR Fourier transform spectrometer
 - Rotationally assigned their spectra utilizing a Loomis-Wood program
 - Performed least-squares fits and obtained new or improved spectroscopic constants
 - Modified least-squares fitting codes to successfully fit perturbed lines observed in TeH and CdH_2
 - Research topic 2: interpretation of the vibration-rotation spectrum of hot BeF_2
 - Rotationally assigned 13 new hot bands for previous recorded and unanalyzed congested portion of the spectrum of BeF_2 with the assistance of a Loomis-Wood program.
 - Performed least-squares fits and obtained much improved spectroscopic constants for BeF_2
 - Modified least-squares fitting codes to simultaneously fit observed vibrational term values and rotational constants to obtain equilibrium vibrational and rotational constants for BeF_2 .
 - Research topic 3: optical-optical double-resonance and laser excitation spectroscopy of SrOD and BaOH
 - Synthesized SrOD using a Broida-type oven and BaOH using a laser-ablation/molecular jet spectrometer

- Recorded and rotationally assigned the spectra
 - Performed least-squares fits and obtained new spectroscopic constants for SrOD
- **Graduate research assistant, East China Normal University, 2000-2003**
 - Research topic: laser spectroscopy of C_2^-
 - Participated in the construction of a spectroscopic apparatus containing a combination of optical-heterodyne amplification, Zeeman-magnetic rotation modulation, velocity modulation or concentration modulation techniques
 - Measured and analyzed high-resolution laser absorption spectra of the transient molecular anion, C_2^- and obtained improved spectroscopic constants

TEACHING EXPERIENCE:

- Graduate teaching assistant (demonstrator) in first year chemistry laboratory, University of Waterloo, 2003-2006
- Graduate teaching assistant (tutor) in General Physics, East China Normal University, 2000-2001

PUBLICATIONS:

1. K. Kaniki, X. Yang, Y. Guo, **S. Yu**, B. Li, Y. Liu and Y. Chen, “Concentration modulation laser spectroscopy of the C_2 molecular Swan system”, Progress in Natural Science, 13 (2003) 736-739.
2. **S. Yu**, X. Yang, B. Li, K. Kaniki, S. Wu, Y. Guo, Y. Liu and Y. Chen, “Study of hot bands of the $B^2\Sigma_u^+ - X^2\Sigma_g^+$ system of C_2^- anion”, Chinese Physics, 12 (2003) 745-749.
3. B. Li, X. Yang, Y. Guo, K. Kaniki, **S. Yu**, Y. Liu and Y. Chen, “Laser spectroscopy study of the (4, 0) and (5, 0) bands of the $d^3\Delta-a^3\Pi$ system of CO” (in Chinese), J. Optics, 24 (2004) 255-259.
4. A. Shayesteh, **S. Yu** and P.F. Bernath, “Infrared emission spectra and equilibrium structures of gaseous HgH_2 and HgD_2 ”, J. Phys. Chem. A 109 (2005) 10280-10286.
5. A. Shayesteh, **S. Yu** and P.F. Bernath, “Gaseous HgH_2 , CdH_2 , and ZnH_2 ”, Chem. Eur. J. 11 (2005) 4709-4712.
6. **S. Yu**, D. Fu, A. Shayesteh, I.E. Gordon, D.R.T. Appadoo and P.F. Bernath, “Infrared and near infrared emission spectra of SbH and SbD ”, J. Mol. Spectrosc. 229 (2005) 257-265.
7. **S. Yu**, A. Shayesteh, D. Fu and P.F. Bernath, “Infrared and near infrared emission spectra of TeH and TeD ”, J. Mol. Spectrosc. 230 (2005) 105-116.
8. **S. Yu**, A. Shayesteh, D. Fu and P.F. Bernath, “The vibration-rotation emission spectrum of gaseous HZnCl ”, J. Phys. Chem. A 109 (2005) 4092-4094.
9. **S. Yu**, A. Shayesteh and P.F. Bernath, “The vibration-rotation emission spectra of gaseous CdH_2 and CdD_2 ”, J. Chem. Phys. 122 (2005) 194301/1-194301/6.
10. **S. Yu**, A. Shayesteh, P.F. Bernath and J. Koput, “The vibration-rotation emission spectrum of hot BeF_2 ”, J. Chem. Phys. 123 (2005) 134303/1-134303/8.
11. **S. Yu**, I.E. Gordon, P.M. Sheridan and P.F. Bernath, “Infrared emission spectroscopy of the $A^4\Phi_i-X^4\Delta_i$ and $B^4\Pi_i-X^4\Delta_i$ transitions of CoS ”, J. Mol. Spectrosc. 236 (2006) 255-259.

12. **S. Yu**, J-G Wang, P.M. Sheridan, M.J. Dick and P.F. Bernath, "Laser spectroscopy of the $\tilde{A}^2\Pi - \tilde{X}^2\Sigma^+ 0_0^0$ and $\tilde{C}^2\Pi - \tilde{A}^2\Pi 0_0^0$ transitions of SrOD", *J. Mol. Spectrosc.* 240 (2006) 26-31.
13. M.J. Dick, P.M. Sheridan, J.-G. Wang, **S. Yu** and P.F. Bernath, "Optical-optical double resonance spectroscopy of the $\tilde{D}^2\Sigma^+ - \tilde{A}^2\Pi$ transition of CaOH", *J. Mol. Spectrosc.* 240 (2006) 238-243.
14. R.S. Ram, I. Gordon, T. Hirao, **S. Yu**, P.F. Bernath and B. Pinchemel, "Fourier transform emission spectroscopy of the $C\ ^3\Delta - X\ ^3\Phi$, $D\ ^3\Delta - X\ ^3\Phi$, $G\ ^3\Phi - X\ ^3\Phi$ and $G\ ^3\Phi - C\ ^3\Delta$ systems of CoCl", *J. Mol. Spectrosc.* 243 (2007) 82-90.
15. J.-G. Wang, M.J. Dick, P.M. Sheridan, **S. Yu** and P.F. Bernath, "Further spectroscopic investigations of the high energy electronic states of SrOH: The $\tilde{B}'\ ^2\Sigma^+ - \tilde{A}^2\Pi 0_0^0$ and the $\tilde{D}^2\Sigma^+ - \tilde{A}^2\Pi 0_0^0$ transitions", *J. Mol. Spectrosc.* 245 (2007) 26-33.
16. T. Hirao, **S. Yu** and T. Amano, "Submillimeter-wave spectroscopy of DCO⁺ in the excited vibrational states: Does the Stark effect cause anomalies in the (02⁰0) state?", *J. Chem. Phys.* 127 (2007) 074301/1-074301/12.
17. T. Hirao, **S. Yu** and T. Amano, "Submillimeter observation of HCO⁺ in the excited vibrational states", *J. Mol. Spectrosc.* 248 (2008) 26-40.
18. **S. Yu**, B.J. Drouin, J.C. Pearson and H.M. Pickett, "Terahertz spectroscopy and global analysis of H₃O⁺", *Astrophys. J. Suppl. Ser.* 180 (2009) 119-124.
19. **S. Yu**, B.J. Drouin, J.C. Pearson, H.M. Pickett, V. Lattanzi and A. Walters "Terahertz spectroscopy and global analysis of the bending vibrations of acetylene ¹²C₂D₂", *Astrophys. J.* 698 (2009) 2114-2120.
20. **S. Yu**, B.J. Drouin and J.C. Pearson, "Terahertz spectroscopy of the bending vibrations of acetylene ¹²C₂H₂", *Astrophys. J.* 705 (2009) 786-790.
21. R.S. Ram, **S. Yu**, I. Gordon and P.F. Bernath, "Fourier transform infrared emission spectroscopy of new systems of NiS", *J. Mol. Spectrosc.* 258 (2009) 20-25.
22. Z. Kisiel, L. Pszczolkowski, B.J. Drouin, C.S. Brauer, **S. Yu** and J.C. Pearson, "The rotational spectrum of acrylonitrile up to 1.67 THz", *J. Mol. Spectrosc.* 258 (2009) 26-34.
23. C.S. Brauer, J.C. Pearson, B.J. Drouin, and **S. Yu**, "New ground state measurements of ethyl cyanide", *Astrophys. J. Suppl. Ser.* 184 (2009) 133-137.
24. B.J. Drouin, **S. Yu**, J.C. Pearson and H.S.P. Muller, "High resolution spectroscopy of ¹²CH₃D and ¹³CH₃D", *J. Quant. Spectrosc. and Radiat. Transfer* (2009), doi:10.1016/j.jqsrt.2009.05.014.
25. **S. Yu**, J. C. Pearson, B. J. Drouin, K. Sung, O. Pirali, M. Vervloet, M.-A. Martin-Drumel, C. P. Endres, T. Shiraishi, K. Kobayashi, and F. Matsushima, "Submillimeter-wave and far-infrared spectroscopy of high-*J* transitions of the ground and n₂ = 1 states of ammonia", *J. Chem. Phys.* (2010) 174317/1-174317/14.
26. B. J. Drouin, **S. Yu**, C. E. Miller, H. S.P. Muller, F. Lewen, S. Brunken, H. Habara, "Terahertz spectroscopy of oxygen, O₂, in its ³S_g⁻ and ¹A electronic states", *J. Quant. Spectrosc. & Radiative Transfer* 111 (2010), 1167-1173.
27. H. Gupta, P. Rimmer, J. C. Pearson, **S. Yu**, E. Herbst, N. Harada, E. A. Bergin, D. A. Neufeld, G. J. Melnick, R. Bachiller, W. Baechtold, T. A. Bell, G. A. Blake, E. Caux, C. Ceccarelli, J. Cernicharo, G. Chattopadhyay, C. Comito, S. Cabrit, N. R. Crockett, F. Daniel, E. Falgarone, M. C. Diez-Gonzalez, M.-L. Dubernet, N. Erickson, M. Emprechtinger, P. Encrenaz, M. Gerin, J. J. Gill, T. F. Giesen, J. R. Goicoechea, P. F. Goldsmith, C. Joblin, D. Johnstone, W. D. Langer, B. Larsson, W. B. Latter, R. H. Lin, D. C. Lis, R. Liseau, S. D. Lord, F. W. Maiwald, S. Maret, P. G. Martin, J. Martin-Pintado, K. M. Menten, P. Morris, H. S. P. Müller, J. A. Murphy, L. H. Nordh, M. Olberg, V. Ossenkopf, L. Pagani, M. Péault, T. G. Phillips, R. Plume, S.-L. Qin, M. Salez, L. A. Samoska, P. Schilke, E. Schlecht, S. Schlemmer, R. Szczepański, J. Stutzki, N.

- Trappe, F. F. S. van der Tak, C. Vastel, S. Wang, H. W. Yorke, J. Zmuidzinas, A. Boogert, R. Güsten, P. Hartogh, N. Honingh, A. Karpov, J. Kooi, J.-M. Krieg, R. Schieder, and P. Zaal, “Detection of OH⁺ and H₂O⁺ towards Orion KL”, *Astron. & Astrophys.* 521 (2010) L47.
28. D. A. Neufeld, J. R. Goicoechea, P. Sonnentrucker, J. H. Black, J. Pearson, **S. Yu**, T. G. Phillips, D. C. Lis, M. De Luca, E. Herbst, P. Rimmer, M. Gerin, T. A. Bell, F. Boulanger, J. Cernicharo, A. Coutens, E. Dartois, M. Kazmierczak, P. Encrenaz, E. Falgarone, T. R. Geballe, T. Giesen, B. Godard, P. F. Goldsmith, C. Gry, H. Gupta, P. Hennebelle, P. Hily-Blant, C. Joblin, R. Kołos, J. Krełowski, J. Martín-Pintado, K. M. Menten, R. Monje, B. Mookerjea, M. Perault, C. Persson, R. Plume, M. Salez, S. Schlemmer, M. Schmidt, J. Stutzki, D. Teyssier, C. Vastel, A. Cros, K. Klein, A. Lorenzani, S. Philipp, L. A. Samoska, R. Shipman, A. G. G. M. Tielens, R. Szczerba and J. Zmuidzinas, “Herschel/HIFI observations of interstellar OH⁺ and H₂O⁺ towards W49N: a probe of diffuse clouds with a small molecular fraction”, *Astron. & Astrophys.* 521 (2010) L10.
29. D. A. Neufeld, P. Sonnentrucker , T. G. Phillips, D. C. Lis, M. De Luca, J. R. Goicoechea, J. H. Black, M. Gerin, T. Bell, F. Boulanger, J. Cernicharo, A. Coutens, E. Dartois, M. Kazmierczak, P. Encrenaz, E. Falgarone, T. R. Geballe, T. Giesen, B. Godard, P. F. Goldsmith, C. Gry, H. Gupta, P. Hennebelle, E. Herbst, P. Hily-Blant, C. Joblin, R. Kołos, J. Krełowski, J. Martín-Pintado, K. M. Menten, R. Monje, B. Mookerjea, J. Pearson, M. Perault, C. Persson, R. Plume, M. Salez, S. Schlemmer, M. Schmidt,J. Stutzki, D. Teyssier, C. Vastel, **S. Yu**, P. Cais, E. Caux, R. Liseau, P. Morris, and P. Planesas, “Strong absorption by interstellar hydrogen fluoride: Herschel/HIFI observations of the sight-line to G10.6–0.4 (W31C)”, *Astron. & Astrophys.* 518 (2010) L108.
30. T. G. Phillips, E. A. Bergin, D. C. Lis, D. A. Neufeld, T. A. Bell, S. Wang, N. R. Crockett, M. Emprechtinger, G. A. Blake, E. Caux, C. Ceccarelli, J. Cernicharo, C. Comito, F. Daniel, M.-L. Dubernet, P. Encrenaz, M. Gerin, T. F. Giesen, J. R. Goicoechea, P. F. Goldsmith, E. Herbst, C. Joblin, D. Johnstone , W. D. Langer,W. D. Latter, S. D. Lord, S. Maret, P. G. Martin, G. J.Melnick, K. M.Menten, P. Morris, H. S. P. Müller, J. A. Murphy, V. Ossenkopf, J. C. Pearson, M. Péault, R. Plume, S.-L. Qin, P. Schilke, S. Schlemmer, J. Stutzki, N. Trappe, F. F. S. van der Tak, C. Vastel, H. W. Yorke, **S. Yu**, J. Zmuidzinas, A. Boogert, R. Güsten, P. Hartogh, N. Honingh, A. Karpov1, J. Kooi, J.-M. Krieg, and R. Schieder, “Herschel observations of EXtra-Ordinary Sources (HEXOS): Detection of hydrogen fluoride in absorption towards Orion KL”, *Astron. & Astrophys.* 518 (2010) L109.
31. P. Sonnentrucker, D. A. Neufeld, T. G. Phillips, M. Gerin, D. C. Lis, M. De Luca, J. R. Goicoechea, J. H. Black, T.A. Bell, F. Boulanger, J. Cernicharo, A. Coutens, E. Dartois, M. Ka'zmierczak, P. Encrenaz, E. Falgarone, T. R. Geballe, T. Giesen, B. Godard, P. F. Goldsmith, C. Gry, H. Gupta, P. Hennebelle, E. Herbst, P. Hily-Blant, C. Joblin, R. Kołos, J. Krełowski, J. Martín-Pintado, K. M. Menten, R. Monje, B. Mookerjea, J. Pearson, M. Perault, C. M. Persson, R. Plume, M. Salez, S. Schlemmer, M. Schmidt, J. Stutzki, D. Teyssier, C. Vastel, **S. Yu**, E. Caux, R. Güsten, W. A. Hatch, T. Klein, I. Mehdi, P. Morris, and J. S.Ward, “Detection of hydrogen fluoride absorption in diffuse molecular clouds with Herschel/HIFI: an ubiquitous tracer of molecular gas”, *Astron. & Astrophys.* 521 (2010) L12.
32. M. Gerin, M. De Luca, J. R. Goicoechea, E. Herbst, E. Falgarone, B. Godard, T. A. Bell, A. Coutens, M. Ka'zmierczak, P. Sonnentrucker, J. H. Black, D. A. Neufeld, T. G. Phillips, J. Pearson, P. B. Rimmer, G. Hassel, D. C. Lis, C. Vastel, F. Boulanger, J. Cernicharo, E. Dartois, P. Encrenaz, T. Giesen, P. F. Goldsmith, H. Gupta, C. Gry, P. Hennebelle, P. Hily-Blant, C. Joblin, R. Kołos, J. Krełowski, J. Martín-Pintado, R. Monje, B. Mookerjea, M. Perault, C. Persson, R. Plume, M. Salez, M. Schmidt, J. Stutzki, D. Teyssier, **S. Yu**, A. Contursi, K.Menten, T. R. Geballe, S. Schlemmer, P. Morris, W. A. Hatch, M. Imram, J. S. Ward, E. Caux, R. Güsten, T. Klein, P. Roelfsema, P. Dieleman, R. Schieder, N. Honingh, and J. Zmuidzinas, “Interstellar CH absorption in the diffuse interstellar medium along the sight-lines to G10.6–0.4 (W31C), W49N, and W51”, *Astron. & Astrophys.* 521 (2010) L16.
33. S.-L. Qin, P. Schilke, C. Comito, T. Möller, R. Rolffs, H. S. P. Müller, A. Belloche, K. M. Menten, D. C. Lis, T. G. Phillips, E. A. Bergin, T. A. Bell, N. R. Crockett, G. A. Blake, S. Cabrit, E. Caux, C. Ceccarelli, J. Cernicharo, F. Daniel, M.-L. Dubernet, M. Emprechtinger, P. Encrenaz, E. Falgarone, M. Gerin, T. F. Giesen,

- J. R. Goicoechea, P. F. Goldsmith, H. Gupta, E. Herbst, C. Joblin, D. Johnstone, W. D. Langer, S. D. Lord, S. Maret, P. G. Martin, G. J. Melnick, P. Morris, J. A. Murphy, D. A. Neufeld, V. Ossenkopf, L. Pagani, J. C. Pearson, M. Péroult, R. Plume, M. Salez, S. Schlemmer, J. Stutzki, N. Trappe, F. F. S. van der Tak, C. Vastel, S. Wang⁴ H. W. Yorke, **S. Yu**, J. Zmuidzinas, A. Boogert, R. Güsten, P. Hartogh, N. Honingh, A. Karpov, J. Kooi, J.-M. Krieg, R. Schieder, M. C. Diez-Gonzalez, R. Bachiller, J. Martin-Pintado, W. Baechtold, M. Olberg, L. H. Nordh, J. L. Gill, and G. Chattopadhyay, “Herschel observations of EXtra-Ordinary Sources (HEXOS): detecting spiral arm clouds by CH absorption lines”, *Astron. & Astrophys.* 521 (2010) L14.
34. E. Falgarone, B. Godard, J. Cernicharo, M. De Luca, M. Gerin, T. G. Phillips, J. H. Black, D. C. Lis, T. A. Bell, F. Boulanger, A. Coutens, E. Dartois, P. Encrenaz, T. Giesen, J. R. Goicoechea, P. F. Goldsmith, H. Gupta, C. Gry, P. Hennebelle, E. Herbst, P. Hily-Blant, C. Joblin, M. Ka'zmierczak, R. Kołos, J. Krełowski, J. Martin-Pintado, R. Monje, B. Mookerjea, D. A. Neufeld, M. Perault, J. C. Pearson, C. Persson, R. Plume, M. Salez, M. Schmidt, P. Sonnentrucker, J. Stutzki, D. Teyssier, C. Vastel, **S. Yu**, K. Menten, T. R. Geballe, S. Schlemmer, R. Shipman, A. G. G. M. Tielens, S. Philipp, A. Cros, J. Zmuidzinas, L. A. Samoska, K. Klein, A. Lorenzani, R. Szczepański, I. Péron, P. Cais, P. Gaufre, A. Cros, L. Ravera, P. Morris, S. Lord, and P. Planesas, “CH⁺(1–0) and ¹³CH⁺(1–0) absorption lines in the direction of massive star-forming regions”, *Astron. & Astrophys.* 521 (2010) L15.
35. B. Mookerjea, T. Giesen, J. Stutzki, J. Cernicharo, J. R. Goicoechea, M. De Luca, T. A. Bell, H. Gupta, M. Gerin, C. M. Persson, P. Sonnentrucker, Z. Makai, J. Black, F. Boulanger, A. Coutens, E. Dartois, P. Encrenaz, E. Falgarone, T. Geballe, B. Godard, P. F. Goldsmith, C. Gry, P. Hennebelle, E. Herbst, P. Hily-Blant, C. Joblin, M. Ka'zmierczak, R. Kołos, J. Krełowski, D. C. Lis, J. Martin-Pintado, K. M. Menten, R. Monje, J. C. Pearson, M. Perault, T. G. Phillips⁵ R. Plume, M. Salez, S. Schlemmer, M. Schmidt, D. Teyssier, C. Vastel, **S. Yu**, P. Dieleman, R. Güsten, C. E. Honingh, P. Morris, P. Roelfsema, R. Schieder, A. G. G. M. Tielens, and J. Zmuidzinas, “Excitation and abundance of C₃ in star forming cores Herschel/HIFI observations of the sight-lines to W31C and W49N”, *Astron. & Astrophys.* 521 (2010) L13.
36. N. R. Crockett, E.A. Bergin, S.Wang, D. C. Lis, T. A. Bell, G. A. Blake, A. Boogert, B. Bumble, S. Cabrit, E. Caux, C. Ceccarelli, J. Cernicharo, C. Comito, F. Daniel, M.-L. Dubernet, M. Emprechtinger, P. Encrenaz, E. Falgarone, M. Gerin, T. F. Giesen, J. R. Goicoechea, P. F. Goldsmith, H. Gupta, R. Güsten, P. Hartogh, F. Helmich, E. Herbst, N. Honingh, C. Joblin, D. Johnstone, A. Karpov, J. H. Kawamura, J. Kooi, J.-M. Krieg, W. D. Langer, W. D. Latter, S. D. Lord, S. Maret, P. G. Martin, G. J. Melnick, K. M. Menten, P. Morris, H. S. P. Müller, J. A. Murphy, D. A. Neufeld, V. Ossenkopf, J. C. Pearson, M. Péroult, T. G. Phillips, R. Plume, S.-L. Qin, P. Roelfsema, R. Schieder, P. Schilke, S. Schlemmer, J. Stutzki, F. F. S. van der Tak, A. Tielens, N. Trappe, C. Vastel, H.W.Yorke, **S. Yu**, and J. Zmuidzinas, “Herschel observations of EXtra-Ordinary Sources (HEXOS): The terahertz spectrum of Orion KL seen at high spectral resolution”, *Astron. & Astrophys.* 521 (2010) L21.
37. E. A. Bergin, T. G. Phillips, C. Comito, N. R. Crockett, D. C. Lis, P. Schilke³, S. Wang, T. A. Bell, G.A. Blake, B. Bumble, E. Caux, S. Cabrit, C. Ceccarelli, J. Cernicharo, F. Daniel, Th. de Graauw, M.-L. Dubernet, M. Emprechtinger, P. Encrenaz, E. Falgarone, M. Gerin, T. F. Giesen, J. R. Goicoechea, P. F. Goldsmith, H. Gupta, P. Hartogh, F. P. Helmich, E. Herbst, C. Joblin, D. Johnstone, J. H. Kawamura, W. D. Langer, W. B. Latter, S. D. Lord, S. Maret, P. G. Martin, G. J. Melnick, K. M. Menten, P. Morris, H. S. P. Müller, J. A. Murphy, D. A. Neufeld, V. Ossenkopf, L. Pagani, J. C. Pearson⁶ M. Péroult, R. Plume, P. Roelfsema, S.-L. Qin, M. Salez, S. Schlemmer, J. Stutzki, A. G. G. M. Tielens, N. Trappe, F. F. S. van der Tak, C. Vastel, H. W. Yorke, **S. Yu**, and J. Zmuidzinas, “Herschel observations of EXtra-Ordinary Sources (HEXOS): the present and future of spectral surveys with Herschel/HIFI”, *Astron. & Astrophys.* 521 (2010) L20.
38. D. C. Lis, J. C. Pearson, D. A. Neufeld, P. Schilke, H. S. P. Müller, H. Gupta, T. A. Bell, C. Comito, T. G. Phillips, E. A. Bergin, C. Ceccarelli, P. F. Goldsmith, G. A. Blake, A. Bacmann, A. Baudry, M. Benedettini, A. Benz, J. Black, A. Boogert, S. Bottinelli, S. Cabrit, P. Caselli, A. Castets, E. Caux, J. Cernicharo, C. Codella, A. Coutens, N. Crimier, N. R. Crockett, F. Daniel, K. Demyk, C. Dominic, M.-L. Dubernet^{10,11}, M.

- Emprechtlinger1, P. Encrenaz25, E. Falgarone9, A. Fuente30, M. Gerin9, T. F. Giesen12, J. R. Goicoechea, F. Helmich, P. Hennebelle, Th. Henning, E. Herbst, P. Hily-Blant, Å. Hjalmarson, D. Hollenbach, T. Jack, C. Joblin, D. Johnstone, C. Kahane, M. Kama, M. Kaufman, A. Klotz, W. D. Langer, B. Larsson4, J. Le Bourlot, B. Lefloch, F. Le Petit, D. Li, R. Liseau, S. D. Lord, A. Lorenzani, S. Maret, P. G. Martin, G. J. Melnick, K. M. Menten, P. Morris, J. A. Murphy, Z. Nagy, B. Nisini, V. Ossenkopf, S. Pacheco6, L. Pagani, B. Parise, M. Péault, R. Plume, S.-L. Qin, E. Roueff, M. Salez, A. Sandqvist, P. Saraceno, S. Schlemmer, K. Schuster, R. Snell, J. Stutzki, A. Tielens, N. Trappe, F. F. S. van der Tak, M. H. D. van derWiel, E. van Dishoeck, C. Vastel, S. Viti, V. Wakelam, A. Walters, S. Wang, F. Wyrowski, H. W. Yorke, **S. Yu**, and J. Zmuidzinas, Y. Delorme, J.-P. Desbat, R. Güsten, J.-M. Krieg, and B. Delforge, “Herschel/HIFI discovery of interstellar chloronium (H_2Cl^+)”, *Astron. & Astrophys.* 521 (2010) L9.
39. R. Rolffs, P. Schilke, C. Comito, E. A. Bergin, F. F. S. van der Tak, D. C. Lis, S.-L. Qin, K. M. Menten, R. Güsten, T. A. Bell, G. A. Blake, E. Caux, C. Ceccarelli, J. Cernicharo, N. R. Crockett, F. Daniel, M.-L. Dubernet, M. Emprechtlinger, P. Encrenaz, M. Gerin, T. F. Giesen, J. R. Goicoechea, P. F. Goldsmith, H. Gupta, E. Herbst, C. Joblin, D. Johnstone, W. D. Langer, W. D. Latter, S. D. Lord, S. Maret, P. G. Martin, G. J. Melnick, P. Morris, H. S. P. Müller, J. A. Murphy, V. Ossenkopf, J. C. Pearson, M. Péault, T. G. Phillips, R. Plume, S. Schlemmer, J. Stutzki, N. Trappe, C. Vastel, S. Wang, H. W. Yorke, **S. Yu**, J. Zmuidzinas, M. C. Diez-Gonzalez, R. Bachiller, J. Martín-Pintado, W. Baechtold, M. Olberg, L. H. Nordh, J. J. Gill, and G. Chattopadhyay, “Reversal of infall in SgrB2(M) revealed by Herschel/HIFI observations of HCN lines at THz frequencies”, *Astron. & Astrophys.* 521 (2010) L46.
40. C. Comito, P. Schilke, R. Rolffs, D. C. Lis, A. Belloche, E. A. Bergin, T. G. Phillips, T. A. Bell, N. R. Crockett, S. Wang, G.A. Blake, E. Caux, C. Ceccarelli, J. Cernicharo, F. Daniel, M.-L. Dubernet, M. Emprechtlinger, P. Encrenaz, M. Gerin, T. F. Giesen, J. R. Goicoechea, P. F. Goldsmith, H. Gupta, E. Herbst, C. Joblin, D. Johnstone, W.D. Langer, W.D. Latter, S. D. Lord, S. Maret, P. G. Martin, G. J. Melnick, K. M. Menten, P. Morris, H. S. P. Müller, J. A. Murphy, D. A. Neufeld, V. Ossenkopf, J. C. Pearson, M. Péault, R. Plume, S.-L. Qin, S. Schlemmer, J. Stutzki, N. Trappe, F. F. S. van der Tak, C. Vastel, H. W. Yorke, **S. Yu**, M. Olberg, R. Szczerba, B. Larsson, R. Liseau, R. H. Lin, L. A. Samoska, and E. Schlecht, “Herschel observations of deuterated water towards Sgr B2(M)”, *Astron. & Astrophys.* 521 (2010) L38.
41. D. C. Lis, T. G. Phillips, P. F. Goldsmith, D. A. Neufeld, E. Herbst, C. Comito, P. Schilke, H. S. P. Müller, E. A. Bergin, M. Gerin, T. A. Bell, M. Emprechtlinger, J. H. Black, G. A. Blake, F. Boulanger, E. Caux, C. Ceccarelli, J. Cernicharo, A. Coutens, N. R. Crockett, F. Daniel, E. Dartois, M. De Luca, M.-L. Dubernet, P. Encrenaz, E. Falgarone, T. R. Geballe, B. Godard, T. F. Giesen, J. R. Goicoechea, C. Gry, H. Gupta, P. Hennebelle, P. Hily-Blant, R. Kołos, J. Krełowski, C. Joblin, D. Johnstone , M. Ka'zmierczak, S. D. Lord, S. Maret, P. G. Martin, J. Martín-Pintado, G. J.Melnick, K. M. Menten, R. Monje, B. Mookerjea, P. Morris, J. A. Murphy, V. Ossenkopf, J. C. Pearson, M. Péault, C. Persson, R. Plume, S.-L. Qin, M. Salez, S. Schlemmer, M. Schmidt, P. Sonnentrucker, J. Stutzki, D. Teyssier, N. Trappe, F. F. S. van der Tak, C. Vastel, S. Wang, H. W. Yorke, **S. Yu**, J. Zmuidzinas, A. Boogert, N. Erickson, A. Karpov, J. Kooi, F. W. Maiwald, R. Schieder, and P. Zaal, “Herschel/HIFI measurements of the ortho/para ratio in water towards Sagittarius B2(M) and W31C”, *Astron. & Astrophys.* 521 (2010) L26.
42. G. J. Melnick, V. Tolls, D. A. Neufeld, E. A. Bergin, T. G. Phillips, S. Wang, N. R. Crockett, T. A. Bell, G. A. Blake, S. Cabrit, E. Caux, C. Ceccarelli, J. Cernicharo, C. Comito, F. Daniel, M.-L. Dubernet, M. Emprechtlinger, P. Encrenaz, E. Falgarone, M. Gerin, T. F. Giesen, J. R. Goicoechea, P. F. Goldsmith, E. Herbst, C. Joblin, D. Johnstone, W. D. Langer, W. D. Latter, D. C. Lis, S. D. Lord, S. Maret, P. G. Martin, K. M. Menten, P. Morris, H. S. P. Müller, J. A. Murphy, V. Ossenkopf, L. Pagani, J. C. Pearson, M. Péault, R. Plume, S.-L.Qin, M. Salez, P. Schilke, S. Schlemmer, J. Stutzki, N. Trappe, F. F. S. van der Tak, C. Vastel, H. W. Yorke, **S. Yu**, and J. Zmuidzinas, “Herschel observations of EXtra-Ordinary Sources (HEXOS): Observations of H_2O and its isotopologues towards Orion KL”, *Astron. & Astrophys.* 521 (2010) L27.
43. C. M. Persson, J. H. Black, J. Cernicharo, J. R. Goicoechea, G. E. Hassel, E. Herbst, M. Gerin, M. De Luca, T. A. Bell, A. Coutens, E. Falgarone, P. F. Goldsmith, H. Gupta, M. Ka'zmierczak, D. C. Lis, B. Mookerjea,

- D. A. Neufeld, J. Pearson, T. G. Phillips, P. Sonnentrucker , J. Stutzki, C. Vastel, **S. Yu**, F. Boulanger, E. Dartois, P. Encrenaz, T. R. Geballe, T. Giesen, B. Godard, C. Gry, P. Hennebelle, P. Hily-Blant, C. Joblin, R. Kołos, J. Krelowski, J. Martín-Pintado, K. Menten, R. Monje, M. Perault, R. Plume, M. Salez, S. Schlemmer, M. Schmidt, D. Teyssier, I. Péron, P. Cais, P. Gaufre, A. Cros, L. Ravera, P. Morris, S. Lord, and P. Planesas, “Nitrogen hydrides in interstellar gas Herschel/HIFI observations towards G10.6-0.4 (W31C)”, Astron. & Astrophys. 521 (2010) L45.
44. P. Schilke, C. Comito, H. S. P. Müller, E. A. Bergin, E. Herbst, D. C. Lis, D. A. Neufeld, T. G. Phillips, T. A. Bell, G.A. Blake, S. Cabrit, E. Caux, C. Ceccarelli, J. Cernicharo, N. R. Crockett, F. Daniel, M.-L. Dubernet, M. Emprechtinger, P. Encrenaz, E. Falgarone, M. Gerin, T. F. Giesen, J. R. Goicoechea, P. F. Goldsmith, H. Gupta, C. Joblin, D. Johnstone, W. D. Langer, W. B. Latter, S. D. Lord, S. Maret, P. G. Martin, G. J. Melnick, K. M. Menten, P. Morris, J. A. Murphy, V. Ossenkopf, L. Pagani, J. C. Pearson, M. Péault, R. Plume S.-L. Qin, M. Salez, S. Schlemmer, J. Stutzki, N. Trappe, F. F. S. van der Tak, C. Vastel, S. Wang, H. W. Yorke, **S. Yu**, N. Erickson, F.W. Maiwald, J. Kooi, A. Karpov, J. Zmuidzinas, A. Boogert, R. Schieder, and P. Zaal, “Herschel observations of ortho- and para-oxidaniumyl (H_2O^+) in spiral arm clouds toward Sagittarius B2(M)”, Astron. & Astrophys. 521 (2010) L11.
45. V. Ossenkopf, H. S. P. Müller, D. C. Lis, P. Schilke, T. A. Bell, S. Bruderer, E. Bergin, C. Ceccarelli, C. Comito, J. Stutzki, A. Bacman, A. Baudry, A. O. Benz, M. Benedettini, O. Berne, G. Blake, A. Boogert, S. Bottinelli, F. Boulanger, S. Cabrit, P. Caselli, E. Caux, J. Cernicharo, C. Codella, A. Coutens, N. Crimier, N. R. Crockett, F. Daniel, K. Demyk, P. Dieleman, C. Dominik, M. L. Dubernet, M. Emprechtinger, P. Encrenaz, E. Falgarone, K. France, A. Fuente, M. Gerin, T. F. Giesen, A. M. di Giorgio, J. R. Goicoechea, P. F. Goldsmith, R. Güsten, A. Harris, F. Helmich, E. Herbst, P. Hily-Blant, K. Jacobs, T. Jacq, Ch. Joblin, D. Johnstone, C. Kahane, M. Kama, T. Klein, A. Klotz, C. Kramer, W. Langer, B. Lefloch, C. Leinz, A. Lorenzani, S. D. Lord, S. Maret, P. G. Martin, J. Martin-Pintado, C. McCoey, M. Melchior, G. J. Melnick, K. M. Menten, B. Mookerjea, P. Morris, J. A. Murphy, D. A. Neufeld, B. Nisini, S. Pacheco, L. Pagani, B. Parise, J. C. Pearson, M. Péault, T. G. Phillips, R. Plume, S.-L. Quin, R. Rizzo, M. Röllig, M. Salez, P. Saraceno, S. Schlemmer, R. Simon, K. Schuster, F. F. S. van der Tak, A. G. G. M. Tielens, D. Teyssier, N. Trappe, C. Vastel, S. Viti, V. Wakelam, A. Walters, S. Wang, N. Whyborn, M. van der Wiel, H. W. Yorke, **S. Yu**, and J. Zmuidzinas, “Detection of interstellar oxidaniumyl: Abundant H_2O^+ towards the star-forming regions DR21, Sgr B2, and NGC6334”, Astron. & Astrophys. 518 (2010) L111.
46. M. Gerin, M. De Luca, J. Black, J. R. Goicoechea, E. Herbst, D. A. Neufeld, E. Falgarone, B. Godard, J. C. Pearson, D. C. Lis, T. G. Phillips, T. A. Bell, P. Sonnentrucker, F. Boulanger, J. Cernicharo, A. Coutens, E. Dartois, P. Encrenaz, T. Giesen, P. F. Goldsmith, H. Gupta, C. Gry, P. Hennebelle, P. Hily-Blant, C. Joblin, M. Kazmierczak, R. Kołos, J. Krelowski, J. Martín-Pintado, R. Monje, B. Mookerjea, M. Perault, C. Persson, R. Plume, P.B. Rimmer, M. Salez, M. Schmidt, J. Stutzki, D. Teyssier, C. Vastel, **S. Yu**, A. Contursi, K. Menten, T. Geballe, S. Schlemmer, R. Shipman, A. G. G. M. Tielens, S. Philipp-May, A. Cros, J. Zmuidzinas, L. A. Samoska, K. Klein, A. Lorenzani, “Interstellar OH^+ , H_2O^+ and H_3O^+ along the sight-line to G10.6–0.4”, Astron. & Astrophys. 518 (2010) L110.
47. O. Leshchishina, S. Kassi, I. E. Gordon, **S. Yu**, A. Campargue, “The $a^1\Delta_g - X^3\Sigma_g^-$ band of $^{16}\text{O}^{17}\text{O}$, $^{17}\text{O}^{18}\text{O}$ and $^{17}\text{O}_2$ by high sensitivity CRDS near 1.27 mm”, J. Quant. Spectrosc. & Radiative Transfer 112 (2011), 1257–1265.
48. S. Kassi, O. Leshchishina, I. E. Gordon, **S. Yu**, A. Campargue, “Hyperfine structure of the $a^1\Delta_g - X^3\Sigma_g^-$ transitions of $^{16}\text{O}^{17}\text{O}$, $^{17}\text{O}^{18}\text{O}$ and $^{17}\text{O}_2$ by CRDS at 80 K”, Chem. Phys. Lett. 502 (2011) 37–41.
49. D. A. Long, D. K. Havey, **S. Yu**, M. Okumura, C.E. Miller, J.T. Hodges, “ O_2 A-band line parameters to support atmospheric remote sensing. Part II: The rare isotopologues”, J. Quant. Spectrosc. & Radiative Transfer 112 (2011), 2527–2541.
50. J.C. Pearson, B.J. Drouin, A. Maestrini, I. Mehdi, J. Ward, R.H. Lin, **S. Yu**, J.J. Gill, B. Thomas, C. Lee, G. Chattopadhyay, E. Schlecht, F.W. Maiwald, P.F. Goldsmith, and P. Siegel, “Demonstration of a room

- temperature 2.48–2.75 THz coherent spectroscopy source”, Rev. Sci. Instrum. 82 (2011), 093105/1-093105/9.
51. J.C. Pearson, B.J Drouin, **S. Yu**, and H. Gupta, “Microwave spectroscopy of methanol between 2.48 and 2.77 THz”, J. Opt. Soc. Am. B 28 (2011), 2549-2577.
 52. B.J Drouin, **S. Yu**, J.C. Pearson and H. Gupta, “Terahertz spectroscopy for space applications: 2.5–2.7 THz spectra of HD, H₂O and NH₃”, J. Mol. Struct. (2011), doi:10.1016/j.molstruc.2011.05.062.
 53. B.J. Drouin and **S.Yu**, “Acetylene spectra near 2.6 THz”, J. Mol. Spectrosc. 269 (2011), 254-256.
 54. D. A. Long, D. K. Havey, **S. Yu**, M. Okumura, C.E. Miller, J.T. Hodges, “O₂ A-band line parameters to support atmospheric remote sensing. Part II: The rare isotopologues”, J. Quant. Spectrosc. & Radiative Transfer 112 (2011), 2527-2541.
 55. **S. Yu**, C. E. Miller, B. J. Drouin and H.S.P. Muller, “High resolution spectral analysis of oxygen I. isotopically invariant dunham fit for the X³Σ_g⁻, a¹Δ_g, b¹Σ_g⁺ states ” J. Chem. Phys. 137 (2012) 024304/1-024304/20.
 56. B. J. Drouin, H. Gupta, **S. Yu**, C. E. Miller, and H.S.P. Muller, “High resolution spectral analysis of oxygen II. rotational spectra of a¹Δ_g O₂ isotopologues”, J. Chem. Phys. 137 (2012) 024305/1-024304/11.

CONFERENCE PRESENTATIONS: (The name of the presenting author is underlined)

Oral

1. S. Yu, D. Fu, A. Shayesteh, D.R.T. Appadoo and P. Bernath, “Infrared and near infrared emission spectra of SbH and SbD”, 59th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 21-25, 2004.
2. A. Shayesteh, S. Yu and Peter Bernath, “The vibration-rotation emission spectra of HgH₂ and HgD₂”, 60th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 20-24, 2005.
3. S. Yu, A. Shayesteh, D. Fu and P.F. Bernath, “The vibration-rotation emission spectrum of gaseous HZnCl”, 60th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, June 20-24, 2005.
4. S. Yu, A. Shayesteh, P.F. Bernath and J. Koput, “Infrared emission spectra of hot BeF₂ and MgF₂”, 60th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 20-24, 2005.
5. S. Yu, A. Shayesteh and P.F. Bernath, “The vibration-rotation emission spectra of gaseous CdH₂ and CdD₂”, 60th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 20-24, 2005.
6. R.S.Ram, I.E. Gordon, T. Hirao, **S. Yu**, P.F. Bernath and B. Pinchemel, “Fourier transform emission spectroscopy of the G ³Φ-X ³Φ, C ³Δ-X ³Φ and G ³Φ-C ³Δ systems of CoCl”, 61st Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 18-23, 2006.
7. J.-G. Wang, P.M. Sheridan, M.J. Dick, **S. Yu** and P.F. Bernath, “Optical-optical double resonance spectroscopy of SrOH: the $\tilde{C}^2\Pi(000)-\tilde{A}^2\Pi(000)$ and the $\tilde{B}^2\Sigma^+(000)-\tilde{A}^2\Pi(000)$ transitions”, 61st Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 18-23, 2006.

8. **S. Yu**, I. E. Gordon, P. M. Sheridan and P. F. Bernath, "Infrared emission spectroscopy of the $A^4\Phi_{\text{i}} - X^4\Delta_{\text{i}}$ and $B^4\Pi_{\text{i}} - X^4\Delta_{\text{i}}$ transitions of CoS", 61st Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 18-23, 2006.
9. T Hirao, **S. Yu** and T. Amano, "Submillimeter observation of HCO⁺ and DCO⁺ in the excited vibrational states", 62nd Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 18-22, 2007.
10. **S. Yu**, J.-G. Wang, P.M. Sheridan, M.J. Dick, and P.F. Bernath, "Laser spectroscopy of the $\tilde{A}^2\Pi - \tilde{X}^2\Sigma^+$ and $\tilde{C}^2\Pi - \tilde{A}^2\Pi$ transitions of SrOD and the $\tilde{A}^2\Pi - \tilde{X}^2\Sigma^+$ transition of BaOH", 62nd Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 18-22, 2007.
11. R.S.Ram, **S. Yu**, I.E. Gordon, T. Hirao, and P.F. Bernath, "Fourier transform infrared emission spectroscopy of new systems of NiS", 63rd Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 16-20, 2008.
12. C.S. Brauer, J.C. Pearson, B.J. Drouin, **S. Yu**, "The submillimeter spectrum of CH₃CH₂CN in its ground vibrational state", 64th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 22-26, 2009.
13. C.S. Brauer, J.C. Pearson, B.J. Drouin, **S. Yu**, "Analysis of the lowest in-plane bend and first excited torsional state of CH₃CH₂CN", 64th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 22-26, 2009.
14. J.C. Pearson, C.S. Brauer, **S. Yu** and B.J. Drouin, "The submillimeter spectrum of the ground torsional state of CH₂DOH", 64th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 22-26, 2009.
15. Z. Kisiel, L.P. Kowski, B.J. Drouin, C.S. Brauer, **S. Yu** and J.C. Pearson, "The rotational spectrum of acrylonitrile to 1.67 THz", 64th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 22-26, 2009.
16. J.C. Pearson, C.S. Brauer, **S. Yu** and B.J. Drouin, "Submillimeter spectroscopy of the out-of-plane bending ν_{20} of C₂H₅CN", 64th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 22-26, 2009.
17. **S. Yu**, B. J. Drouin, J. C. Pearson and H.M. Pickett, "Terahertz spectroscopy and global analysis of H₃O⁺", 64th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 22-26, 2009.
18. **S. Yu**, B.J. Drouin, J.C. Pearson, H.M. Pickett, V. Lattanzi and A. Walters, "Terahertz spectroscopy and global analysis of the bending vibrations of ¹²C₂H₂ and ¹²C₂D₂", 64th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 22-26, 2009.
19. **S. Yu** and B. J. Drouin, "Terahertz spectroscopy of the ground state of methylamine CH₃NH₂)", 64th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 22-26, 2009.
20. **S. Yu**, J.C. Pearson, B.J. Drouin and K. Sung, O. Pirali, M. Vervloet and M.-A. Martin, C.P. Endres, T. Shiraishi, K. Kobayashi and F. Matsushima, "Submillimeter-wave and far-infrared spectroscopy of high- J transitions of ammonia", Boston, MA, USA, June 16-18, 2010.
21. H. Gupta, **S. Yu**, B.J. Drouin, C.E. Miller, H.S.P. Müller, "THz spectroscopy of the $a^1\Delta_g$ state of O¹⁸O and ¹⁸O₂", 65th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 21-25, 2010.

22. B.J. Drouin, **S. Yu**, J.C. Pearson, "The JPL Millimeter and Submillimeter Spectral Line Catalog", 65th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 21-25, 2010.
23. O. Pirali, M.-A. Martin, M. Vervloet, D. Balcon, **S. Yu**, J. Pearson, B. Drouin, C.P. Endres, T. Shiraishi, K. Kobayashi and F. Matsushima, "Terahertz and far-infrared spectroscopy of high-*J* transitions of the ground and $v_2=1$ states of NH₃", 65th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 21-25, 2010.
24. B.J. Drouin, **S. Yu**, J.C. Pearson, "Revisiting the ammonia hyperfine structure with SPFIT", 65th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 21-25, 2010.
25. J.C. Pearson, **S. Yu**, B.J. Drouin, O. Pirali, M.-A. Martin, M. Verloet, D. Balcon, C.P. Endres, "Can the inversion-vibration-rotation problem in the v_4 and $2v_2$ states of NH₃ be solved to experimental accuracy?", 65th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 21-25, 2010.
26. **S. Yu**, J.C. Pearson, B.J. Drouin, A. Walters, H.S.P. Müller and Sandra Brünken, "Terahertz spectroscopy of excited water", 65th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 21-25, 2010.
27. **S. Yu**, J.C. Pearson and B.J. Drouin, "Laboratory spectroscopy of HO⁺, H₂O⁺ and H₃O⁺", SMILES 2010, Spectroscopy of Molecular Ions in the Laboratory and in (Extraterrestrial) Space, Kos, Greece, Oct. 3-6, 2010.
28. Z. Kisiel, L.P. Kowski, B.J. Drouin, C.S. Brauer, **S. Yu**, J.C. Pearson, I.R. Medvedev, S. Fortman, C. Neese, "Vibrational energies for acrylonitrile from MM-wave to THz rotational spectra", 66th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 20-24, 2011.
29. H.S.P. Muller, S. Brunken, C.P. Endres, F. Lewen, J.C. Pearson, **S. Yu**, B.J. Drouin, H. Mader, "Analysis of the rotational spectrum of HDO in its $v_2 = 0$ and 1 vibrational states up to 2.8 THz", 66th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 20-24, 2011.
30. J.C. Pearson, **S. Yu**, H. Gupta and B.J. Drouin, "Rotational spectroscopy of HD¹⁸O", 66th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 20-24, 2011.
31. O.M. Leshchishina, S. Kassi, I.E. Gordon, **S. Yu**, A. Campargue, "Rotational and hyperfine analysis of the $a^1\Delta_g - X^3\Sigma_g^-$ band of ¹⁷O-containing isotopologues of oxygen measured by CRDS at room and liquid temperatures", 66th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 20-24, 2011.
32. **S. Yu**, C. E. Miller, B.J. DROUIN and H.S.P. Muller, "A global fit of the $X^3\Sigma_g^-$, $a^1\Delta_g$, $b^1\Sigma_g^+$, $B^3\Sigma_u^-$ states of the six isotopologues of oxygen", 66th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 20-24, 2011.
33. J.C. Pearson, **S. Yu**, H. Gupta and B.J. Drouin, "Terahertz spectroscopy of high K methanol transitions", 66th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 20-24, 2011.
34. **S. Yu**, J.C. Pearson, B.J. Drouin, H.S.P. Muller, S. Brunken, M.A. Martin-Drumel, O. Pirali, D. Balcon, M. Vervloet, L.H. Coudert, "Analysis of new data sets pertaining to the water molecule", 66th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 20-24, 2011.
35. J.C. Pearson, **S. Yu**, H. Gupta and B.J. Drouin, "Vibrationally hot HCN in the laboratory and IRC+10216", 66th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 20-24, 2011.
36. N.R. Crockett, E.A. Bergin, S. Wang, G. Blake, M. Emprechtinger, D. Lis, H. Gupta, J. Pearson, **S. Yu**, T. Bell, J. Cernicharo, S. Lord, R. Plume, P. Schilke, F. Van Der Tak "Herschel Observations of F Extra-

Ordinary Sources (HEXOS): Analysis of the HIFI 1.2THz wide spectral survey toward Orion KL”, 66th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 20-24, 2011.

37. H. Gupta, J.C. Pearson, **S. Yu**, P. Rimmer, E. Herst, E.A. Bergin “Detection of OH⁺ and H₂O⁺ toward Orion KL”, 66th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 20-24, 2011.
38. **S. Yu**, C. E. Miller, B. J. Drouin and H.S.P. Muller, “Isotopically invariant Dunham fit for the $X^3\Sigma_g^-$, $a^1\Delta_g$, $b^1\Sigma_g^+$ states of oxygen”, 67th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 18-22, 2012.
39. B. J. Drouin, H. Gupta, **S. Yu**, C. E. Miller, and H.S.P. Muller, “The rotational spectra of 17-O substituted oxygen singlet Delta”, 67th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 18-22, 2012.
40. Z. Kisiel, L.P. Kowski, B.J. Drouin, C. S. Brauer, **S. Yu**, J.C. Pearson, I.R. Medvedev, S. Fortman and C. Neese, “Perturbation and vibrational energies in acrylonitrile from global analysis of its MW-wave to THz rotational spectrum”, 67th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 18-22, 2012.
41. S. Schlemmer, C.P. Endres, B.J. Drouin, **S. Yu**, J.C. Pearson, H.S.P. Muller, P. Schilke, and J. Stutzki, “CDMS and JPL molecular spectroscopy catalogues in a common infrastructure: VAMDC”, 67th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 18-22, 2012.
42. J.C. Pearson, **S. Yu** and B.J. Drouin, “Assignments, perturbations, pathologies and a rotational analysis of the spectrum of CH₂DOH”, 67th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 18-22, 2012.
43. J.C. Pearson, **S. Yu** and B.J. Drouin, “THz and long path Fourier transform spectroscopy of methanol: torsionally coupled high-K levels”, 67th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 18-22, 2012.
44. R.A. Motiyenko, L. Margules, V.V. Ilyushin, E. A. Alekseev, B.J. Drouin, **S. Yu**, J. Cernicharo, B. Tercero, “Terahertz spectroscopy of methylamine”, 67th Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 18-22, 2012.

Poster

1. D. Fu, **S. Yu**, D.R.T. Appadoo and P.F. Bernath, “Study of the FT IR and near-IR Emission Spectra of SbH”, 19th Annual Symposium on Chemical Physics, University of Waterloo, Waterloo, Ontario, Oct. 29-Nov. 2, 2003.
2. **S. Yu**, X. Yang, B. Li, K. Kanili, S. Wu, Y. Guo, Y. Liu and Y. Chen, “Study of hot bands of the $B^2\Sigma_u^+ - X^2\Sigma_g^+$ system of C₂⁻anion”, 19th Annual Symposium on Chemical Physics, University of Waterloo, Waterloo, Ontario, Oct. 29-Nov. 2, 2003.
3. **S. Yu**, A. Shayesteh, D. Fu and P.F. Bernath, “Emission Spectroscopy of TeH, TeD and HZnCl”, 20th Annual Symposium on Chemical Physics, University of Waterloo, Waterloo, Ontario, Oct. 29-31, 2004.
4. **S. Yu**, I.E. Gordon, P.M. Sheridan and P.F. Bernath, “The infrared electronic spectroscopy of CoS”, 21st Annual Symposium on Chemical Physics, University of Waterloo, Waterloo, Ontario, Oct. 28-30, 2005.

5. M.J. Dick, J.-G. Wang, P.M. Sheridan, **S. Yu** and P. Bernath, "Optical-optical double resonance spectroscopic studies of SrOH and CaOH", 22nd Annual Symposium on Chemical Physics, University of Waterloo, Waterloo, Ontario, Nov. 3-5, 2006.
6. **S. Yu**, J.-G. Wang, P.M. Sheridan, M.J. Dick and P.F. Bernath, "Laser spectroscopy of alkaline-earth monohydroxides: the $\tilde{A}^2\Pi - \tilde{X}^2\Sigma^+$ and $\tilde{C}^2\Pi - \tilde{A}^2\Pi$ transitions of SrOD and the $\tilde{A}^2\Pi - \tilde{X}^2\Sigma^+$ transition of BaOH", 22nd Annual Symposium on Chemical Physics, University of Waterloo, Waterloo, Ontario, Nov. 3-5, 2006.
7. **S. Yu**, B.J. Drouin, J.C. Pearson and H.M. Pickett, "Terahertz Spectroscopy of ions of astrophysical interest", 2008 JPL Postdoc Research Day Poster Session, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California, Aug. 26, 2008.
8. **S. Yu**, B. Drouin and J. Pearson, "Terahertz spectroscopy of H_3O^+ , CH_3NH_2 , C_2H_2 and C_2D_2 ", 2009 Center for Chemistry of the Universe Workshop, NRAO Facility, Green Bank, West Virginia, May 26-29, 2009.
9. **S. Yu**, B. Drouin and J. Pearson, "Terahertz spectroscopy of the bending vibrations of acetylene $^{12}\text{C}_2\text{H}_2$ and $^{12}\text{C}_2\text{D}_2$ ", 214th AAS Meeting , Pasadena, CA, June 7-11, 2009.
10. O. Pirali, M.-A. Martin, M. Vervloet, D. Balcon, **S. Yu**, J. Pearson, B. Drouin, C.P. Endres, T. Shiraishi, K. Kobayashi and F. Matsushima, "Terahertz and far-infrared spectroscopy of high- J transitions of the ground and $v_2=1$ states of NH_3 ", 21st International Conference on High Resolution Molecular Spectroscopy, Poznan, Poland, Sept. 7-11, 2010.
11. **S. Yu**, W. Chun, J.C. Pearson, B.J. Drouin, T. Crawford and H. Gupta, "Development of two ion generation systems at JPL", 2010 NASA Laboratory Astrophysics Workshop, Gatlinburg, TN, USA, Oct. 25-28, 2010.
12. C. M. Persson, M. De Luca, B. Mookerjea, M. Gerin, J.H. Black, T.A. Bell, B. Godard, J. Goicoechea, G. Hassel, E. Herbst, P. Hily-Blant, K. Menten, H. Muller, A.O.H Olofsson, J. Pearson, **S. Yu**, , and the PRISMAS team, "Nitrogen hydrides in interstellar gas towards G10.6-0.4 (W31C) and W49N: THE MOLECULAR UNIVERSE", IAU SYMPOSIUM 280, , Toledo, Spain, May 30 - June 3, 2011.

HONORS AND AWARDS:

• JQSRT Young Scientist Awards 2010	2010
• NASA Postdoctoral Program Fellowship at Jet Propulsion Laboratory	2008-2009
• University of Waterloo, Chemistry Department, F.W. Karasek Scholarship	2007
• Ontario Graduate Scholarship	2006-2007
• The University of Waterloo President's Graduate Scholarship	2006-2007
• University of Waterloo, Chemistry Department, H.G. McLeod Scholarship	2006
• Chinese Government Award for Outstanding Self-Financed Students Abroad	2005
• East China Normal University, Excellent Postgraduate Student Scholarship	2001
• East China Normal University, Title of Excellent Graduate	2000
• East China Normal University, Excellent Student	1999
• East China Normal University, Award of Top Grade	1999