

# Shanshan Yu

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## 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  $\text{H}_3\text{O}^+$ ,  $\text{C}_2\text{D}_2$ ,  $\text{C}_2\text{H}_2$ ,  $\text{CH}_3\text{NH}_2$ ,  $\text{NH}_3$  and  $\text{O}_2$  with a terahertz spectrometer
- Modeled the observed  $\text{H}_3\text{O}^+$ ,  $\text{C}_2\text{D}_2$ ,  $\text{C}_2\text{H}_2$  transitions together with prior available infrared data
- Parameterized the quantum mechanical Hamiltonian for  $\text{CH}_3\text{NH}_2$ ,  $\text{NH}_3$  and  $\text{O}_2$
- Participated in the design and fabrication of a new plasma generating system for ions
- Will lead the construction of 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  $\text{CH}_3\text{OH}$ ,  $\text{HCOOCH}_3$ ,  $\text{CH}_3\text{OCH}_3$ ,  $\text{CH}_3\text{CH}_2\text{CN}$  and their isotopologues
- Research topic 3: analysis of astrophysical spectroscopic observations
  - Goal: identifying interstellar species and study their physical and chemical environments
  - Currently working on identifying 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  $\text{HCO}^+$  and  $\text{DCO}^+$ 
    - Synthesized  $\text{HCO}^+$  and  $\text{DCO}^+$  with an extended negative glow discharge
    - Recorded pure rotational spectra of  $\text{HCO}^+$  and  $\text{DCO}^+$  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  $\text{SbH}$ ,  $\text{SbD}$ ,  $\text{TeH}$ ,  $\text{TeD}$ ,  $\text{CdH}_2$ ,  $\text{CdD}_2$  and  $\text{HZnCl}$  in the gas phase using a high temperature tube furnace with an electrical discharge. Synthesized  $\text{CoS}$  and  $\text{NiS}$  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  $\text{TeH}$  and  $\text{CdH}_2$
  - Research topic 2: interpretation of the vibration-rotation spectrum of hot  $\text{BeF}_2$ 
    - Rotationally assigned 13 new hot bands for previous recorded and unanalyzed congested portion of the spectrum of  $\text{BeF}_2$  with the assistance of a Loomis-Wood program.
    - Performed least-squares fits and obtained much improved spectroscopic constants for  $\text{BeF}_2$
    - Modified least-squares fitting codes to simultaneously fit observed vibrational term values and rotational constants to obtain equilibrium vibrational and rotational constants for  $\text{BeF}_2$ .
  - Research topic 3: optical-optical double-resonance and laser excitation spectroscopy of  $\text{SrOD}$  and  $\text{BaOH}$ 
    - Synthesized  $\text{SrOD}$  using a Broida-type oven and  $\text{BaOH}$  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  $A^4\Phi_1 - X^4\Delta_1$  and  $B^4\Pi_1 - X^4\Delta_1$  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  $\tilde{B}^1\Sigma^+ - \tilde{A}^2\Pi 0_0^0$  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<sup>+</sup> in the excited vibrational states: Does the Stark effect cause anomalies in the (02<sup>2</sup>0) state?”, *J. Chem. Phys.* 127 (2007) 074301/1-074301/12.
17. T. Hirao, **S. Yu** and T. Amano, “Submillimeter observation of HCO<sup>+</sup> 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 H<sub>3</sub>O<sup>+</sup>”, *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 <sup>12</sup>C<sub>2</sub>D<sub>2</sub>”, *Astrophys. J.* 698 (2009) 2114-2120.
20. **S. Yu**, B.J. Drouin and J.C. Pearson, “Terahertz spectroscopy of the bending vibrations of acetylene <sup>12</sup>C<sub>2</sub>H<sub>2</sub>”, *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 <sup>12</sup>CH<sub>3</sub>D and <sup>13</sup>CH<sub>3</sub>D”, *J. Quant. Spectrosc. and Radi. 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 n<sub>2</sub>=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, O<sub>2</sub>, in its <sup>3</sup>Σ<sub>g</sub><sup>-</sup> and <sup>1</sup>Δ 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. Pérault, T. G. Phillips, R. Plume, S.-L. Qin, M. Salez, L. A. Samoska, P. Schilke, E. Schlecht, S. Schlemmer, R. Szczerba, 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<sup>+</sup> and H<sub>2</sub>O<sup>+</sup> 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. Krelowski, 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<sup>+</sup> and H<sub>2</sub>O<sup>+</sup> 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. Krelowski, 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. Pérault, 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. Karpov, 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.
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32. M. Gerin, M. De Luca, J. R. Goicoechea, E. Herbst, E. Falgarone, B. Godard, T. A. Bell, A. Coutens, M. Kazmierczak, 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. Krelowski, 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. Pérault, R. Plume, M. Salez, S. Schlemmer, J. Stutzki, N. Trappe, F. F. S. van der Tak, C. Vastel, S. Wang, 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.
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19. S. Yu and B. J. Drouin, “Terahertz spectroscopy of the ground state of methylamine CH<sub>3</sub>NH<sub>2</sub>”, 64<sup>th</sup> 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.
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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”, 66<sup>th</sup> Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 20-24, 2011.
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35. [J.C. Pearson](#), [S. Yu](#), H. Gupta and B.J. Drouin, “Vibrationally hot HCN in the laboratory and IRC+10216”, 66<sup>th</sup> 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”, 66<sup>th</sup> Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, USA, June 20-24, 2011.
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## Poster

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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  $C_2^-$  anion", 19<sup>th</sup> 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", 20<sup>th</sup> 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", 21<sup>st</sup> 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.
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9. [S. Yu](#), B. Drouin and J. Pearson, "Terahertz spectroscopy of the bending vibrations of acetylene  $^{12}C_2H_2$  and  $^{12}C_2D_2$ ", 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  $NH_3$ ", 21<sup>st</sup> 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.

## 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