

Shanshan Yu

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Education:

- **B.Eng. in optoelectronics**, East China Normal University, China (2000)
- **M.Sc. in optics**, East China Normal University, Shanghai, China (2003)
- **Ph.D. in physical chemistry**, University of Waterloo, Canada (2007)

Professional Experience:

- **Graduate research assistant** (2003-2007), University of Waterloo
- **Postdoctoral scholar** (2007), University of Waterloo
- **NASA postdoctoral scholar** (2008-2009), Jet Propulsion Laboratory
- **Scientist** (2010-present), Jet Propulsion Laboratory, **Member for the following Teams**
 - OCO-3 Instrument Calibration Team (2017-present)
 - OCO-2 Instrument Calibration Team (2017-present)
 - OCO-2 ABSCO Team (2014-2016)
 - Herschel observations of EXtra-Ordinary Sources (HEXOS) Team (2010-2014)
 - PRobing InterStellar Molecules with Absorption line Studies (PRISMAS) Team (2010-2014)
 - Herschel/HIFI Instrument Team (2010-2014)
 - JPL Molecular Spectroscopy Team (2010-present)

Funded Research Projects:

- PI: NASA/PICASSO (2017-2020), “*Mllimeter-wave spectrometer for chirality and relative abundance determination of amino acid biomarkers (ChiralSpec)*”
- PI: JPL/Spontaneous R&TD (2016), “*Laboratory measurements to enable advances in remote sensing of near-surface CH₄ concentrations*”
- PI: NASA/APRA (2013-2016), “*Study of NH₃ line intensities in the THz and Far-IR region*”
- PI: JPL/ Spontaneous R&TD (2013), “*Development of a novel apparatus for simulating the interstellar medium*”
- PI: French National Synchrotron Facility (2013), “*Spectroscopy of far-IR NH₃ transitions involving 3 v_2 and higher vibrational states: using evolution of spectra from 200 K to 350 K to empirically estimate lower state energies*”
- PI: French National Synchrotron Facility (2010), “*Measurement of positions and intensities of the ground, v_2 , 2 v_2 and v_4 inversion bands of ammonia*”
- CO-I: JPL/Spontaneous R&TD (2015), “*First direct measurements of global atmospheric isoprene from satellite observations*”

- CO-I: NASA/ACLS (2015-2018), “*Millimeter and submillimeter spectroscopy in support of atmospheric research*”
- CO-I: NASA/ACLS (2011-2014), “*Millimeter and submillimeter spectroscopy in support of upper atmospheric research*”
- CO-I: NASA/APRA (2010-2013), “*Systematic spectroscopy on the primary sources of interstellar lines*”
- CO-I: Herschel Open Time Cycle-1 (OT1) Observations (2010), “*Investigation of the nitrogen chemistry in diffuse and dense interstellar gas*”
- CO-I: Herschel Open Time Cycle-2 (OT2) Observations (2010), “*Probing The Unique Environment Around Sgr A**” (2010)

Peer-reviewed Publications (complete list on the following pages)

- 88 peer-reviewed publications to date (22 first-authored)
- 1751 total citations, Max citation =113, Max citation (first author) =29
- H-index (Web of Science): 24 (see <http://www.researcherid.com/rid/D-8733-2016>)

Honors and Awards:

- **Voyager Award**, JPL Planetary Science directorate (2017)
 - *For winning ROSES16 PICASSO proposal award*
- **Guest Editor**, Journal of Molecular Spectroscopy (2015-present)
- **Voyager Award**, JPL Science Division (2015)
 - *For contribution in the field of molecular spectroscopic research leading to the receipt of the prestigious 2015 Flygare Award*
- **Flygare Award**, International Symposium on Molecular Spectroscopy (2015)
 - *For outstanding contributions in molecular spectroscopy by an early career independent scientist*
 - *Established in 2015, Awarded to four scientists in 2015 and two in 2017*
- **NASA Group Achievement Award** to U.S. Herschel HIFI Instrument Team (2014)
 - *For outstanding calibration and analysis support provided to the Herschel HIFI Instrument Control Center that enabled a superbly operating instrument until end of mission*
- **Peer Reviewing Excellence**, Elsevier and Journal of Molecular Spectroscopy (2014)
 - *In recognition of an outstanding contribution to the quality of the journal*
- **Editorial Board member**, Journal of Molecular spectroscopy (2013-2016)
- **Elsevier JQSRT Outstanding Young Scientist Award** in Quantitative Spectroscopy (2010)
 - *Given to one young scientist in one year on a biennial basis*
- **NASA Postdoctoral Program Fellowship** at Jet Propulsion Laboratory (2008-2009)
- **F.W. Karasek Scholarship**, University of Waterloo, Chemistry Department (2007)
 - *Awarded annually to a graduate student registered in the chemistry department based on ability and promise in research and performance in at least two completed graduate courses*
- **Ontario Graduate Scholarship** (2006-2007)
 - *Funded by the Province of Ontario in Canada*
 - *Awarded to students at the Master’s and doctoral levels in all disciplines of academic study*
 - *3000 scholarship awarded annually, 90 of these awarded to visa students such as me*
- **The University of Waterloo President’s Graduate Scholarship** (2006-2007)

- **H.G. McLeod Scholarship**, University of Waterloo, Chemistry Department (2006)
 - Awarded annually to a graduate student registered in the chemistry department on the basis of overall abilities, including both research and coursework
- **Chinese Government Award for Outstanding Self-Financed Students Abroad** (2005)
 - Granted annually to no more than 500 self-financed Chinese students studying overseas
- **Excellent Postgraduate Student Scholarship**, East China Normal University (2001)
- **Title of Excellent Graduate**, East China Normal University (2000)
- **Excellent Student**, East China Normal University (1999)
- **Award of Top Grade**, East China Normal University (1999)
- **Second Award of Scholarship**, East China Normal University (1998)
- **Second Award of Scholarship**, East China Normal University (1997)

Other Lead Experience

- **First-Author Publications Involving External Collaborations:**
 - “Terahertz spectroscopy and global analysis of the bending vibrations of acetylene $^{12}\text{C}_2\text{D}_2$ ”, *Astrophys. J.* 698, 2114 (2009)
 - *Collaborated with the molecular spectroscopy group at University of Toulouse in France*
 - “Submillimeter-wave and far-infrared spectroscopy of high- J transitions of the ground and $\nu_2 = 1$ states of ammonia”, *J. Chem. Phys.* 133, 174317 (2010)
 - *Collaborated with the molecular spectroscopy groups at French National Synchrotron Facility and the university of Toyama in Japan*
 - “High resolution spectral analysis of oxygen I. isotopically invariant dunham fit for the $X^3\Sigma_g^-, a^1\Delta_g, b^1\Sigma_g^+$ states”, *J. Chem. Phys.* 137, 024304 (2012)
 - *Collaborated with the molecular spectroscopy group at University of Cologne in Germany*
 - “Measurement and analysis of new terahertz and far-infrared spectra of high temperature water”, *J. Mol. Spectrosc.* 279, 16 (2012)
 - *Collaborated with the molecular spectroscopy groups at French National Synchrotron Facility, French National center for Scientific Research, University of Cologne in Germany*
 - “Terahertz spectroscopy of ground state HD^{18}O ”, *J. Chem. Phys.* 133, 174317 (2016)
 - *Collaborated with the molecular spectroscopy group the university of Toyama in Japan*
- **Personnel Management:**
 - Mentor to summer students: Jeniveve Pearson (2016, 2017);
 - Mentor to postdoctoral research fellows: Adam Daly (April 2013 – 2015), Harshal Gupta (June 2011 – 2015) and Ben Elliott (Jan. 2013 – Dec. 2014)
 - Peer host of Dr Takayoshi Amano as a JPL Visiting Independent Advisor (2012-present)
 - Coordinated the transfer of Dr. Amano’s 80 experimental apparatuses from Canada to JPL (2014)
 - Provided guidance on hyperfine data analysis of O-17 oxygen ($^{16}\text{O}^{17}\text{O}$, $^{17}\text{O}^{17}\text{O}$ and $^{17}\text{O}^{18}\text{O}$) to the following non-JPL graduate students and postdocs: David Long (Caltech) in 2011, Olga Leshchishina and Samir Kassi (University of Grenoble, France) in 2011

Other Professional Services

- **Organizer** for mini-symposium in International Symposium on Molecular Spectroscopy
- **Member of the Flygare awards committee** for the International Symposium on Molecular Spectroscopy (2016-present)
- **Member of the International Advisory Committee** for the International Symposium on Molecular Spectroscopy (2016-present)
- **Proposal Panel Review:** NSF (2016)
- **Journal Article Review:** Journal of Quantitative Spectroscopy & Radiative Transfer; Astrophysical Journal; Journal of Molecular Spectroscopy; Chemical Physics Letters; Physica Scripta
- **Section chair**, Linelists, International Symposium on Molecular Spectroscopy (2015)
- **Section chair**, Microwave, International Symposium on Molecular Spectroscopy (2012)
- **Judge** for the Rao Prize, International Symposium on Molecular Spectroscopy (2012)

Invited/Plenary Talks at Major International Conferences/Department Seminars

(complete list of all conference presentations on the following pages, 76 oral, 11 posters)

- 02/02/2016, Division of Geological and Planetary Sciences, California Institute of Technology
- 01/29/2016, 63rd Pacific Conference on Spectroscopy and Dynamics, Pacific Grove, California
- 06/24/2015, 70th International Symposium on Molecular Spectroscopy, Champaign-Urbana, Illinois
- 09/03/2010, SMILES 2010, Spectroscopy of Molecular Ions in the Laboratory and in (Extraterrestrial) Space, Kos, Greece

Publications (89 total, 22 first authored):

1. **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.
2. 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.
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) 69-77.
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⁺ in the excited vibrational states: Does the Stark effect cause anomalies in the (02²0) 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. & Radiative Transfer* 110 (2009) 2077-2081.
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 $\nu_2=1$ 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 ³Σ_g⁻ and ¹Δ 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⁺ 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. Zmuidzinias, “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. 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. Zmuidzinias, 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.
 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. 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. 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. 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. 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. Zmuidzinias, “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.

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