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Far and mid-infrared studies of star forming regions

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Bibliography

Bibliography

- Agúndez, M. & Wakelam, V. 2013, *Chemical Reviews*, 113, 8710
- Albertsson, T., Semenov, D., & Henning, T. 2014, *ApJ*, 784, 39
- Albertsson, T., Semenov, D. A., Vasyunin, A. I., Henning, T., & Herbst, E. 2013, *ApJ*, 207, 27
- André, P., Motte, F., & Bacmann, A. 1999, *ApJ*, 513, L57
- André, P., Ward-Thompson, D., & Barsony, M. 1993, *ApJ*, 406, 122
- André, P., Ward-Thompson, D., & Barsony, M. 2000, *Protostars and Planets IV*, 59
- Aniano, G., Draine, B. T., Gordon, K. D., & Sandstrom, K. 2011, *PASP*, 123, 1218
- Arce, H. G. & Sargent, A. I. 2006, *ApJ*, 646, 1070
- Arce, H. G., Shepherd, D., Gueth, F., et al. 2007, *Protostars and Planets V*, 245
- Bachiller, R. & Pérez Gutiérrez, M. 1997, *ApJ*, 487, L93
- Bacmann, A., André, P., Puget, J.-L., et al. 2000, *A&A*, 361, 555
- Bacmann, A., Lefloch, B., Ceccarelli, C., et al. 2002, *A&A*, 389, L6
- Bacmann, A., Lefloch, B., Ceccarelli, C., et al. 2003, *ApJ*, 585, L55
- Bakes, E. L. O. & Tielens, A. G. G. M. 1994, *ApJ*, 427, 822
- Bally, J. & Zinnecker, H. 2005, *AJ*, 129, 2281
- Battersby, C., Bally, J., Dunham, M., et al. 2014, *ApJ*, 786, 116
- Belloche, A., Parise, B., van der Tak, F. F. S., et al. 2006, *A&A*, 454, L51
- Bergin, E. A. & Tafalla, M. 2007a, *ARA&A*, 45, 339

- Bergin, E. A. & Tafalla, M. 2007b, *ARA&A*, 45, 339
- Beuther, H., Churchwell, E. B., McKee, C. F., & Tan, J. C. 2007, *Protostars and Planets V*, 165
- Beuther, H., Semenov, D., Henning, T., & Linz, H. 2008, *ApJ*, 675, L33
- Biham, O., Furman, I., Pirronello, V., & Vidali, G. 2001, *ApJ*, 553, 595
- Bisschop, S. E., Fraser, H. J., Öberg, K. I., van Dishoeck, E. F., & Schlemmer, S. 2006, *A&A*, 449, 1297
- Blake, G. A., Sandell, G., van Dishoeck, E. F., et al. 1995, *ApJ*, 441, 689
- Blake, G. A., Sutton, E. C., Masson, C. R., & Phillips, T. G. 1987, *ApJ*, 315, 621
- Bohlin, R. C., Savage, B. D., & Drake, J. F. 1978, *ApJ*, 224, 132
- Bolato, A. D., Wolfire, M., & Leroy, A. K. 2013, *ARA&A*, 51, 207
- Bontemps, S., André, P., Terebey, S., & Cabrit, S. 1996, *A&A*, 311, 858
- Boselli, A., Lequeux, J., & Gavazzi, G. 2002, *Ap&SS*, 281, 127
- Bourke, T. L., Crapsi, A., Myers, P. C., et al. 2005, *ApJ*, 633, L129
- Bourke, T. L., Myers, P. C., Evans, II, N. J., et al. 2006, *ApJ*, 649, L37
- Bruderer, S., Benz, A. O., Doty, S. D., van Dishoeck, E. F., & Bourke, T. L. 2009, *ApJ*, 700, 872
- Buckle, J. V., Hills, R. E., Smith, H., et al. 2009, *MNRAS*, 399, 1026
- Burton, M. G., Hollenbach, D. J., & Tielens, A. G. G. M. 1990, *ApJ*, 365, 620
- Cardelli, J. A., Ebbets, D. C., & Savage, B. D. 1993, *ApJ*, 413, 401
- Caselli, P., van der Tak, F. F. S., Ceccarelli, C., & Bacmann, A. 2003, *A&A*, 403, L37
- Caselli, P., Vastel, C., Ceccarelli, C., et al. 2008, *A&A*, 492, 703
- Caselli, P., Walmsley, C. M., Tafalla, M., Dore, L., & Myers, P. C. 1999, *ApJ*, 523, L165
- Caux, E., Ceccarelli, C., Castets, A., et al. 1999, *A&A*, 347, L1
- Ceccarelli, C. 2004, in *Astronomical Society of the Pacific Conference Series*, Vol. 323, *Star Formation in the Interstellar Medium: In Honor of David Hollenbach*, ed. D. Johnstone, F. C. Adams, D. N. C. Lin, D. A. Neufeld, & E. C. Ostriker, 195
- Ceccarelli, C. 2008, in *IAU Symposium*, Vol. 251, *Organic Matter in Space*, ed. S. Kwok & S. Sanford, 79–88

- Ceccarelli, C., Bacmann, A., Boogert, A., et al. 2010, *A&A*, 521, L22
- Ceccarelli, C., Caselli, P., Bockelée-Morvan, D., et al. 2014, *Protostars and Planets VI*, 859
- Ceccarelli, C., Castets, A., Loinard, L., Caux, E., & Tielens, A. G. G. M. 1998, *A&A*, 338, L43
- Ceccarelli, C., Loinard, L., Castets, A., Tielens, A. G. G. M., & Caux, E. 2000, *A&A*, 357, L9
- Cesaroni, R. 2005, in *IAU Symposium, Vol. 227, Massive Star Birth: A Crossroads of Astrophysics*, ed. R. Cesaroni, M. Felli, E. Churchwell, & M. Walmsley, 59–69
- Chen, X., Arce, H. G., Zhang, Q., et al. 2010, *ApJ*, 715, 1344
- Choi, M. 2005, *ApJ*, 630, 976
- Choi, M., Kamazaki, T., Tatematsu, K., & Panis, J.-F. 2004, *ApJ*, 617, 1157
- Crampton, D. & Fisher, W. A. 1974, *Publications of the Dominion Astrophysical Observatory Victoria*, 14, 283
- Crapsi, A., Caselli, P., Walmsley, C. M., et al. 2005a, *ApJ*, 619, 379
- Crapsi, A., Devries, C. H., Huard, T. L., et al. 2005b, *A&A*, 439, 1023
- Crowther, P. A., Schnurr, O., Hirschi, R., et al. 2010, *MNRAS*, 408, 731
- Dale, D. A. & Helou, G. 2002, *ApJ*, 576, 159
- Daniel, F., Dubernet, M.-L., & Grosjean, A. 2011, *A&A*, 536, A76
- Daniel, F., Dubernet, M.-L., Pacaud, F., & Grosjean, A. 2010, *A&A*, 517, A13
- de Wit, W. J., Hoare, M. G., Fujiyoshi, T., et al. 2009a, *A&A*, 494, 157
- de Wit, W. J., Hoare, M. G., Fujiyoshi, T., et al. 2009b, *A&A*, 494, 157
- Dedes, C., Röllig, M., Mookerjea, B., et al. 2010, *A&A*, 521, L24
- Di Francesco, J., Myers, P. C., Wilner, D. J., Ohashi, N., & Mardones, D. 2001a, *ApJ*, 562, 770
- Di Francesco, J., Myers, P. C., Wilner, D. J., Ohashi, N., & Mardones, D. 2001b, *ApJ*, 562, 770
- Dieter, N. H. & Goss, W. M. 1966, *Reviews of Modern Physics*, 38, 256
- Dobrijevic, M., Ollivier, J. L., Billebaud, F., Brillet, J., & Parisot, J. P. 2003, *A&A*, 398, 335

- Draine, B. T. 1978, *ApJ*, 36, 595
- Draine, B. T. 2011, *Physics of the Interstellar and Intergalactic Medium*
- Draine, B. T. & Lee, H. M. 1984, *ApJ*, 285, 89
- Duarte-Cabral, A., Bontemps, S., Motte, F., et al. 2014a, *A&A*, 570, A1
- Duarte-Cabral, A., Bontemps, S., Motte, F., et al. 2014b, *A&A*, 570, A1
- Dubernet, M.-L., Daniel, F., Grosjean, A., & Lin, C. Y. 2009, *A&A*, 497, 911
- Dumouchel, F., Faure, A., & Lique, F. 2010, *MNRAS*, 406, 2488
- Dunham, M. M., Crapsi, A., Evans, II, N. J., et al. 2008, *ApJ*, 179, 249
- Dunham, M. M., Evans, II, N. J., Bourke, T. L., et al. 2006, *ApJ*, 651, 945
- el-Qadi, W. H. & Stancil, P. C. 2013, *ApJ*, 779, 97
- Elitzur, M., Hollenbach, D. J., & McKee, C. F. 1992, *ApJ*, 394, 221
- Enoch, M. L., Evans, II, N. J., Sargent, A. I., & Glenn, J. 2009a, *ApJ*, 692, 973
- Enoch, M. L., Evans, II, N. J., Sargent, A. I., & Glenn, J. 2009b, *ApJ*, 692, 973
- Enoch, M. L., Lee, J.-E., Harvey, P., Dunham, M. M., & Schnee, S. 2010, *ApJ*, 722, L33
- Enoch, M. L., Young, K. E., Glenn, J., et al. 2006, *ApJ*, 638, 293
- Etxaluze, M., Goicoechea, J. R., Cernicharo, J., et al. 2013, *A&A*, 556, A137
- Evans, N. J. 2011, in *IAU Symposium, Vol. 270, Computational Star Formation*, ed. J. Alves, B. G. Elmegreen, J. M. Girart, & V. Trimble, 25–32
- Evans, II, N. J., Allen, L. E., Blake, G. A., et al. 2003, *PASP*, 115, 965
- Evans, II, N. J., Dunham, M. M., Jørgensen, J. K., et al. 2009, *ApJ*, 181, 321
- Evans, II, N. J., Mundy, L. G., Kutner, M. L., & Depoy, D. L. 1989, *ApJ*, 346, 212
- Evans, II, N. J., Rawlings, J. M. C., Shirley, Y. L., & Mundy, L. G. 2001, *ApJ*, 557, 193
- Fayolle, E. C., Bertin, M., Romanzin, C., et al. 2011, *ApJ*, 739, L36
- Fayolle, E. C., Bertin, M., Romanzin, C., et al. 2013, *A&A*, 556, A122
- Flower, D. R. 1999, *MNRAS*, 305, 651
- Fontani, F., Codella, C., Ceccarelli, C., et al. 2014a, *ApJ*, 788, L43
- Fontani, F., Palau, A., Caselli, P., et al. 2011, *A&A*, 529, L7

- Fontani, F., Sakai, T., Furuya, K., et al. 2014b, MNRAS, 440, 448
- Friesen, R. K., Kirk, H. M., & Shirley, Y. L. 2013, ApJ, 765, 59
- Furuya, R. S., Kitamura, Y., Wootten, A., Claussen, M. J., & Kawabe, R. 2003, ApJ, 144, 71
- Garrod, R. T. 2008, A&A, 491, 239
- Garrod, R. T. & Herbst, E. 2006, A&A, 457, 927
- Gerner, T., Beuther, H., Semenov, D., et al. 2014, A&A, 563, A97
- Giannini, T., Nisini, B., Lorenzetti, D., et al. 2000, A&A, 358, 310
- Goldsmith, P. F. 2001, ApJ, 557, 736
- Goldsmith, P. F. & Langer, W. D. 1978, ApJ, 222, 881
- Goldsmith, P. F. & Langer, W. D. 1999, ApJ, 517, 209
- Gonçalves, J., Galli, D., & Girart, J. M. 2008, A&A, 490, L39
- Graedel, T. E., Langer, W. D., & Frerking, M. A. 1982, ApJ, 48, 321
- Graninger, D. M., Herbst, E., Öberg, K. I., & Vasyunin, A. I. 2014, ApJ, 787, 74
- Green, S. 1991, ApJ, 76, 979
- Green, S. 1995, ApJ, 100, 213
- Green, S. & Chapman, S. 1978, ApJ, 37, 169
- Gregersen, E. M. & Evans, II, N. J. 2000, ApJ, 538, 260
- Grenier, I. A., Casandjian, J.-M., & Terrier, R. 2005, Science, 307, 1292
- Guan, X., Stutzki, J., Graf, U. U., et al. 2012, A&A, 542, L4
- Guertler, J., Henning, T., Kruegel, E., & Chini, R. 1991, A&A, 252, 801
- Gürtler, J., Henning, T., Kruegel, E., & Chini, R. 1991, A&A, 252, 801
- Gutermuth, R. A., Myers, P. C., Megeath, S. T., et al. 2008, ApJ, 674, 336
- Harada, N., Herbst, E., & Wakelam, V. 2010, ApJ, 721, 1570
- Harada, N., Herbst, E., & Wakelam, V. 2012, ApJ, 756, 104
- Harvey, P. M., Adams, J. D., Herter, T. L., et al. 2012, ApJ, 749, L20
- Harvey, P. M., Campbell, M. F., & Hoffmann, W. F. 1978, ApJ, 219, 891

- Haschick, A. D., Moran, J. M., Rodriguez, L. F., et al. 1980, *ApJ*, 237, 26
- Hasegawa, T. I., Herbst, E., & Leung, C. M. 1992, *ApJ*, 82, 167
- Hatchell, J., Richer, J. S., Fuller, G. A., et al. 2005, *A&A*, 440, 151
- Hennebelle, P. & Motte, F. 2009, in *EAS Publications Series*, Vol. 34, *EAS Publications Series*, ed. L. Pagani & M. Gerin, 177–193
- Herbig, G. H. & Jones, B. F. 1983, *AJ*, 88, 1040
- Herbst, E. & van Dishoeck, E. F. 2009, *ARA&A*, 47, 427
- Herrera-Camus, R., Bolatto, A. D., Wolfire, M. G., et al. 2015, *ApJ*, 800, 1
- Heyminck, S., Graf, U. U., Güsten, R., et al. 2012, *A&A*, 542, L1
- Hincelin, U., Chang, Q., & Herbst, E. 2015, *A&A*, 574, A24
- Hirota, T., Ando, K., Bushimata, T., et al. 2008, *PASJ*, 60, 961
- Hoare, M. G. 2006, *ApJ*, 649, 856
- Hogerheijde, M. R. & van der Tak, F. F. S. 2000, *A&A*, 362, 697
- Hollenbach, D., Kaufman, M. J., Bergin, E. A., & Melnick, G. J. 2009, *ApJ*, 690, 1497
- Hollenbach, D. J. & Tielens, A. G. G. M. 1997, *ARA&A*, 35, 179
- Hollenbach, D. J. & Tielens, A. G. G. M. 1999, *Reviews of Modern Physics*, 71, 173
- Hüttemeister, S., Wilson, T. L., Bania, T. M., & Martin-Pintado, J. 1993, *A&A*, 280, 255
- Ikeda, N. & Kitamura, Y. 2011, *ApJ*, 732, 101
- Indriolo, N., Neufeld, D. A., Gerin, M., et al. 2015, *ApJ*, 800, 40
- Ivezic, Z., Groenewegen, M. A. T., Men'shchikov, A., & Szczerba, R. 1997, *MNRAS*, 291, 121
- Jaquet, R., Staemmler, V., Smith, M. D., & Flower, D. R. 1992, *Journal of Physics B Atomic Molecular Physics*, 25, 285
- Jones, A. 2014, *ArXiv e-prints* 1411.6666
- Jørgensen, J. K., Bourke, T. L., Myers, P. C., et al. 2007, *ApJ*, 659, 479
- Jørgensen, J. K., Harvey, P. M., Evans, II, N. J., et al. 2006, *ApJ*, 645, 1246
- Jørgensen, J. K., Schöier, F. L., & van Dishoeck, E. F. 2002, *A&A*, 389, 908

- Kalberla, P. M. W., Burton, W. B., Hartmann, D., et al. 2005, *A&A*, 440, 775
- Kang, M., Lee, J.-E., Choi, M., et al. 2013, *ApJS*, 209, 25
- Karska, A., Herczeg, G. J., van Dishoeck, E. F., et al. 2013, *A&A*, 552, A141
- Katz, N., Furman, I., Biham, O., Pirronello, V., & Vidali, G. 1999, *ApJ*, 522, 305
- Kaufman, M. J., Wolfire, M. G., Hollenbach, D. J., & Luhman, M. L. 1999, *ApJ*, 527, 795
- Kaźmierczak-Barthel, M., Semenov, D. A., van der Tak, F. F. S., Chavarría, L., & van der Wiel, M. H. D. 2015, *A&A*, 574, A71
- Knee, L. B. G. & Sandell, G. 2000, *A&A*, 361, 671
- Koumpia, E., Harvey, P. M., Ossenkopf, V., et al. 2015, *A&A*, 580, A68
- Kramer, C., Stutzki, J., Rohrig, R., & Corneliussen, U. 1998, *A&A*, 329, 249
- Kristensen, L. E., van Dishoeck, E. F., Bergin, E. A., et al. 2012a, *A&A*, 542, A8
- Kristensen, L. E., van Dishoeck, E. F., Bergin, E. A., et al. 2012b, *A&A*, 542, A8
- Krumholz, M. R. & Matzner, C. D. 2009, *ApJ*, 703, 1352
- Kwok, S. 2007, *Physics and Chemistry of the Interstellar Medium*
- Lacy, J. H., Knacke, R., Geballe, T. R., & Tokunaga, A. T. 1994, *ApJ*, 428, L69
- Langer, W. D., Castets, A., & Lefloch, B. 1996, *ApJ*, 471, L111
- Langer, W. D. & Penzias, A. A. 1990, *ApJ*, 357, 477
- Langer, W. D. & Penzias, A. A. 1993, *ApJ*, 408, 539
- Langer, W. D., Velusamy, T., Pineda, J. L., et al. 2010, *A&A*, 521, L17
- Larson, R. B. 1969, *MNRAS*, 145, 271
- Launhardt, R., Stutz, A. M., Schmiedeke, A., et al. 2013, *A&A*, 551, A98
- Lay, O. P., Carlstrom, J. E., & Hills, R. E. 1995, *ApJ*, 452, L73
- Lebouteiller, V., Cormier, D., Madden, S. C., et al. 2012, *A&A*, 548, A91
- Lee, C. W., Kim, M.-R., Kim, G., et al. 2013, *ApJ*, 777, 50
- Lee, K. I., Dunham, M. M., Myers, P. C., et al. 2015, *ApJ*, 814, 114
- Lefloch, B., Castets, A., Cernicharo, J., & Loinard, L. 1998, *ApJ*, 504, L109

- Leurini, S., Wyrowski, F., Wiesemeyer, H., et al. 2015, ArXiv e-prints
- Li, A. & Draine, B. T. 2001, *ApJ*, 554, 778
- Li, W., Evans, II, N. J., Jaffe, D. T., van Dishoeck, E. F., & Thi, W.-F. 2002, *ApJ*, 568, 242
- Linsky, J. L., Diplas, A., Wood, B. E., et al. 1995, *ApJ*, 451, 335
- Lique, F. & Kłos, J. 2011, *MNRAS*, 413, L20
- Lique, F., Spielfiedel, A., & Cernicharo, J. 2006, *A&A*, 451, 1125
- Lis, D. C. & Schilke, P. 2003, *ApJ*, 597, L145
- Liseau, R., Justtanont, K., & Tielens, A. G. G. M. 2006, *A&A*, 446, 561
- Liseau, R., White, G. J., Larsson, B., et al. 1999, *A&A*, 344, 342
- Loinard, L., Castets, A., Ceccarelli, C., Caux, E., & Tielens, A. G. G. M. 2001, *ApJ*, 552, L163
- Loinard, L., Castets, A., Ceccarelli, C., et al. 2000, *A&A*, 359, 1169
- Loison, J.-C., Halvick, P., Bergeat, A., Hickson, K. M., & Wakelam, V. 2012, *MNRAS*, 421, 1476
- Looney, L. W., Mundy, L. G., & Welch, W. J. 2000a, *ApJ*, 529, 477
- Looney, L. W., Mundy, L. G., & Welch, W. J. 2000b, *ApJ*, 529, 477
- Looney, L. W., Mundy, L. G., & Welch, W. J. 2003, *ApJ*, 592, 255
- Luhman, K. L. 2012, *ARA&A*, 50, 65
- Luhman, M. L., Satyapal, S., Fischer, J., et al. 1998, *ApJ*, 504, L11
- Machida, M. N. & Hosokawa, T. 2013, *MNRAS*, 431, 1719
- Machida, M. N., Matsumoto, T., & Inutsuka, S.-i. 2008, *ApJ*, 685, 690
- Malhotra, S., Helou, G., Stacey, G., et al. 1997, *ApJ*, 491, L27
- Malhotra, S., Kaufman, M. J., Hollenbach, D., et al. 2001, *ApJ*, 561, 766
- Mardones, D., Myers, P. C., Tafalla, M., et al. 1997, *ApJ*, 489, 719
- Maret, S., Bergin, E. A., Neufeld, D. A., et al. 2009, *ApJ*, 698, 1244
- Maret, S., Ceccarelli, C., Caux, E., Tielens, A. G. G. M., & Castets, A. 2002, *A&A*, 395, 573

- Maret, S., Ceccarelli, C., Caux, E., et al. 2004a, *A&A*, 416, 577
- Maret, S., Ceccarelli, C., Caux, E., et al. 2004b, *A&A*, 416, 577
- Maret, S., Ceccarelli, C., Tielens, A. G. G. M., et al. 2005, *A&A*, 442, 527
- Marvel, K. B., Wilking, B. A., Claussen, M. J., & Wootten, A. 2008, *ApJ*, 685, 285
- Mathieu, R. D. 1994, *ARA&A*, 32, 465
- Maud, L. T. & Hoare, M. G. 2013, *ApJ*, 779, L24
- Meijerink, R. & Spaans, M. 2005, *A&A*, 436, 397
- Minchin, N. R., White, G. J., & Padman, R. 1993, *A&A*, 277, 595
- Minchin, N. R., White, G. J., Stutzki, J., & Krause, D. 1994, *A&A*, 291, 250
- Minchin, N. R., White, G. J., & Ward-Thompson, D. 1995, *A&A*, 301, 894
- Mizutani, M., Onaka, T., & Shibai, H. 2004, *A&A*, 423, 579
- Mookerjee, B., Kramer, C., Buchbender, C., et al. 2011, *A&A*, 532
- Motte, F. & André, P. 2001, *A&A*, 365, 440
- Muñoz, J. A. & Oh, S. P. 2015, ArXiv e-prints
- Mueller, K. E., Shirley, Y. L., Evans, II, N. J., & Jacobson, H. R. 2002a, *ApJ*, 143, 469
- Mueller, K. E., Shirley, Y. L., Evans, II, N. J., & Jacobson, H. R. 2002b, *ApJ*, 143, 469
- Müller, H. S. P., Schlöder, F., Stutzki, J., & Winnewisser, G. 2005, *Journal of Molecular Structure*, 742, 215
- Müller, H. S. P., Thorwirth, S., Roth, D. A., & Winnewisser, G. 2001, *A&A*, 370, L49
- Nagy, Z., Van der Tak, F. F. S., Ossenkopf, V., et al. 2013, *A&A*, 550, A96
- Öberg, K. I., Garrod, R. T., van Dishoeck, E. F., & Linnartz, H. 2009, *A&A*, 504, 891
- Okada, Y., Onaka, T., Shibai, H., & Doi, Y. 2003, *A&A*, 412, 199
- Okada, Y., Pilleri, P., Berné, O., et al. 2013, *A&A*, 553, A2
- Okada, Y., Requena-Torres, M. A., Güsten, R., et al. 2015, *A&A*, 580, A54
- Ossenkopf, V. & Henning, T. 1994a, *A&A*, 291, 943
- Ossenkopf, V. & Henning, T. 1994b, *A&A*, 291, 943

- Ossenkopf, V., Röllig, M., Cubick, M., & Stutzki, J. 2007, in *Molecules in Space and Laboratory*, 95
- Ossenkopf, V., Röllig, M., Kramer, C., et al. 2011, in *EAS Publications Series*, Vol. 52, *EAS Publications Series*, ed. M. Röllig, R. Simon, V. Ossenkopf, & J. Stutzki, 181–186
- Ossenkopf, V., Röllig, M., Neufeld, D. A., et al. 2013, *A&A*, 550, A57
- Padoan, P. & Nordlund, Å. 2011, *ApJ*, 730, 40
- Padovani, M., Walmsley, C. M., Tafalla, M., Hily-Blant, P., & Pineau Des Forêts, G. 2011, *A&A*, 534, A77
- Pagani, L., Bourgoïn, A., & Lique, F. 2012, *A&A*, 548, L4
- Pagani, L., Lesaffre, P., Jorfi, M., et al. 2013, *A&A*, 551, A38
- Papadopoulos, P. P., Thi, W.-F., Miniati, F., & Viti, S. 2011, *MNRAS*, 414, 1705
- Parise, B., Ceccarelli, C., Tielens, A. G. G. M., et al. 2006, *A&A*, 453, 949
- Park, G. & Choi, M. 2007, *ApJ*, 664, L99
- Pezzuto, S., Elia, D., Schisano, E., et al. 2012, *A&A*, 547, A54
- Phillips, T. G., Huggins, P. J., Wannier, P. G., & Scoville, N. Z. 1979, *ApJ*, 231, 720
- Pickett, H. M., Poynter, R. L., Cohen, E. A., et al. 1998, *JQSRT*, 60, 883
- Pineda, J. E., Arce, H. G., Schnee, S., et al. 2011, *ApJ*, 743, 201
- Pineda, J. L., Langer, W. D., Velusamy, T., & Goldsmith, P. F. 2013, *A&A*, 554, A103
- Plume, R., Fuller, G. A., Helmich, F., et al. 2007, *PASP*, 119, 102
- Poelman, D. R. & Spaans, M. 2005, *A&A*, 440, 559
- Poelman, D. R. & Spaans, M. 2006, *A&A*, 453, 615
- Poglitsch, A., Waelkens, C., Geis, N., et al. 2010, *A&A*, 518, L2
- Preibisch, T. & Smith, M. D. 2002, *A&A*, 383, 540
- Quillen, A. C., Thorndike, S. L., Cunningham, A., et al. 2005, *ApJ*, 632, 941
- Rabli, D. & Flower, D. R. 2010, *MNRAS*, 406, 95
- Roberts, H., Herbst, E., & Millar, T. J. 2004, *A&A*, 424, 905
- Roberts, H. & Millar, T. J. 2000, *A&A*, 361, 388

- Robitaille, T. P., Whitney, B. A., Indebetouw, R., & Wood, K. 2007, *ApJ*, 169, 328
- Rodríguez, L. F., Anglada, G., Torrelles, J. M., et al. 2002, *A&A*, 389, 572
- Roelfsema, P. R., Helmich, F. P., Teysier, D., et al. 2012, *A&A*, 537, A17
- Röllig, M., Abel, N. P., Bell, T., et al. 2007, *A&A*, 467, 187
- Röllig, M., Kramer, C., Rajbahak, C., et al. 2011, *A&A*, 525, A8
- Röllig, M., Ossenkopf, V., Jeyakumar, S., Stutzki, J., & Sternberg, A. 2006a, *A&A*, 451, 917
- Röllig, M., Ossenkopf, V., Jeyakumar, S., Stutzki, J., & Sternberg, A. 2006b, *A&A*, 451, 917
- Röllig, M., Szczerba, R., Ossenkopf, V., & Glück, C. 2013, *A&A*, 549, A85
- Roueff, E., Lis, D. C., van der Tak, F. F. S., Gerin, M., & Goldsmith, P. F. 2005, *A&A*, 438, 585
- Ruffle, D. P. & Herbst, E. 2000, *MNRAS*, 319, 837
- Sadavoy, S. I., Di Francesco, J., André, P., et al. 2014, *ApJ*, 787, L18
- Sakai, N., Saruwatari, O., Sakai, T., Takano, S., & Yamamoto, S. 2010, *A&A*, 512, A31
- San José-García, I., Mottram, J. C., Kristensen, L. E., et al. 2013, *A&A*, 553, A125
- Sandell, G. & Knee, L. B. G. 2001, *ApJ*, 546, L49
- Santangelo, G., Codella, C., Cabrit, S., et al. 2015, *ArXiv e-prints*
- Santangelo, G., Nisini, B., Codella, C., et al. 2014, *A&A*, 568, A125
- Sarrasin, E., Abdallah, D. B., Wernli, M., et al. 2010, *MNRAS*, 404, 518
- Sault, R. J., Teuben, P. J., & Wright, M. C. H. 1995, in *Astronomical Society of the Pacific Conference Series*, Vol. 77, *Astronomical Data Analysis Software and Systems IV*, ed. R. A. Shaw, H. E. Payne, & J. J. E. Hayes, 433
- Schilke, P., Walmsley, C. M., Pineau des Forets, G., & Flower, D. R. 1997, *A&A*, 321, 293
- Schilke, P., Walmsley, C. M., Pineau Des Forets, G., et al. 1992, *A&A*, 256, 595
- Schnee, S., Sadavoy, S., Di Francesco, J., Johnstone, D., & Wei, L. 2012, *ApJ*, 755, 178
- Schöier, F. L., van der Tak, F. F. S., van Dishoeck, E. F., & Black, J. H. 2005, *A&A*, 432, 369

- Semenov, D., Hersant, F., Wakelam, V., et al. 2010, *A&A*, 522, A42
- Semenov, D. & Wiebe, D. 2011, *ApJ*, 196, 25
- Shah, R. Y. 2000, PhD thesis, 530 Edgemont Road, Charlottesville, VA 22903
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- Shah, R. Y. & Wootten, A. 2001, *ApJ*, 554, 933
- Shang, H. 2007, *Ap&SS*, 311, 25
- Shipman, R. F., van der Tak, F. F. S., Wyrowski, F., Herpin, F., & Frieswijk, W. 2014, *A&A*, 570, A51
- Smith, K. W., Bonnell, I. A., Emerson, J. P., & Jenness, T. 2000, *MNRAS*, 319, 991
- Snell, R. L., Mundy, L. G., Goldsmith, P. F., Evans, II, N. J., & Erickson, N. R. 1984, *ApJ*, 276, 625
- Snow, T. P. & McCall, B. J. 2006, *ARA&A*, 44, 367
- Sofia, U. J., Lauroesch, J. T., Meyer, D. M., & Cartledge, S. I. B. 2004, *ApJ*, 605, 272
- Spaans, M. & van Dishoeck, E. F. 1997, *A&A*, 323, 953
- Stahler, S. W. & Palla, F. 2005, *The Formation of Stars*
- Stäuber, P., Doty, S. D., van Dishoeck, E. F., Jørgensen, J. K., & Benz, A. O. 2004, *A&A*, 425, 577
- Sternberg, A. & Dalgarno, A. 1995a, *ApJ*, 99, 565
- Sternberg, A. & Dalgarno, A. 1995b, *ApJ*, 99, 565
- Tafalla, M., Myers, P. C., Mardones, D., & Bachiller, R. 2000, *A&A*, 359, 967
- Tan, J. C. 2015, 1510.08021
- Tan, J. C., Beltrán, M. T., Caselli, P., et al. 2014, *Protostars and Planets VI*, 149
- Tielens, A. G. G. M. 2005, *The Physics and Chemistry of the Interstellar Medium*
- Tielens, A. G. G. M. 2012, in *IAU Symposium, Vol. 284, IAU Symposium*, ed. R. J. Tuffs & C. C. Popescu, 72–81
- Tielens, A. G. G. M. & Hollenbach, D. 1985, *ApJ*, 291, 722
- Timmermann, R., Bertoldi, F., Wright, C. M., et al. 1996, *A&A*, 315, L281
- Tobin, J. J., Bergin, E. A., Hartmann, L., et al. 2013, *ApJ*, 765, 18

- Tobin, J. J., Looney, L. W., Wilner, D. J., et al. 2015, *ApJ*, 805, 125
- Tofani, G., Felli, M., Taylor, G. B., & Hunter, T. R. 1995, *A&As*, 112, 299
- Tomida, K., Machida, M. N., Saigo, K., Tomisaka, K., & Matsumoto, T. 2010, *ApJ*, 725, L239
- Troland, T. H. & Crutcher, R. M. 2008, *ApJ*, 680, 457
- van der Tak, F. F. S., Black, J. H., Schöier, F. L., Jansen, D. J., & van Dishoeck, E. F. 2007a, *A&A*, 468, 627
- van der Tak, F. F. S., Black, J. H., Schöier, F. L., Jansen, D. J., & van Dishoeck, E. F. 2007b, *A&A*, 468, 627
- van der Tak, F. F. S. & van Dishoeck, E. F. 2000a, *A&A*, 358, L79
- van der Tak, F. F. S. & van Dishoeck, E. F. 2000b, *A&A*, 358, L79
- van der Tak, F. F. S., van Dishoeck, E. F., Evans, II, N. J., Bakker, E. J., & Blake, G. A. 1999, *ApJ*, 522, 991
- van der Tak, F. F. S., van Dishoeck, E. F., Evans, II, N. J., & Blake, G. A. 2000, *ApJ*, 537, 283
- van Dishoeck, E. F. 2006, *Proceedings of the National Academy of Science*, 103, 12249
- van Dishoeck, E. F. & Blake, G. A. 1998, *ARA&A*, 36, 317
- van Dishoeck, E. F., Herbst, E., & Neufeld, D. A. 2013, *Chemical Reviews*, 113, 9043
- van Kempen, T. A., Hogerheijde, M. R., van Dishoeck, E. F., et al. 2006, *A&A*, 454, L75
- Vastel, C., Spaans, M., Ceccarelli, C., Tielens, A. G. G. M., & Caux, E. 2001, *A&A*, 376, 1064
- Vasyunin, A. I. & Herbst, E. 2013, *ApJ*, 769, 34
- Vasyunin, A. I., Semenov, D., Henning, T., et al. 2008, *ApJ*, 672, 629
- Vasyunin, A. I., Sobolev, A. M., Wiebe, D. S., & Semenov, D. A. 2004, *Astronomy Letters*, 30, 566
- Visser, R., Kristensen, L. E., Bruderer, S., et al. 2012, *A&A*, 537, A55
- Wakelam, V. & Herbst, E. 2008, *ApJ*, 680, 371
- Wakelam, V., Selsis, F., Herbst, E., & Caselli, P. 2005, *A&A*, 444, 883
- Wannier, P. G. 1980, *ARA&A*, 18, 399

- Weigelt, G., Balega, Y. Y., Hofmann, K.-H., & Preibisch, T. 2002, *A&A*, 392, 937
- Wiesenfeld, L. & Faure, A. 2013, *MNRAS*, 432, 2573
- Wiesenfeld, L. & Goldsmith, P. F. 2014, *ApJ*, 780, 183
- Wilson, T. L. 1999, *Reports on Progress in Physics*, 62, 143
- Wilson, T. L. & Rood, R. 1994, *ARA&A*, 32, 191
- Winston, E., Megeath, S. T., Wolk, S. J., et al. 2010, *AJ*, 140, 266
- Wootten, A. 1995, *ApSS*, 224, 43
- Wu, Y., Wei, Y., Zhao, M., et al. 2004, *A&A*, 426, 503
- Yang, B., Stancil, P. C., Balakrishnan, N., & Forrey, R. C. 2010, *ApJ*, 718, 1062
- Yıldız, U. A., Kristensen, L. E., van Dishoeck, E. F., et al. 2012, *A&A*, 542, A86
- Yıldız, U. A., Kristensen, L. E., van Dishoeck, E. F., et al. 2013, *A&A*, 556, A89
- Yıldız, U. A., van Dishoeck, E. F., Kristensen, L. E., et al. 2010, *A&A*, 521, L40
- Yorke, H. W. & Bodenheimer, P. 2008, in *Astronomical Society of the Pacific Conference Series*, Vol. 387, *Massive Star Formation: Observations Confront Theory*, ed. H. Beuther, H. Linz, & T. Henning, 189
- Young, C. H., Jørgensen, J. K., Shirley, Y. L., et al. 2004, *ApJ*, 154, 396
- Young, E. T., Becklin, E. E., Marcum, P. M., et al. 2012, *ApJ*, 749, L17
- Young, K. E., Young, C. H., Lai, S.-P., Dunham, M. M., & Evans, II, N. J. 2015, *AJ*, 150, 40
- Young Owl, R. C., Meixner, M. M., Wolfire, M., Tielens, A. G. G. M., & Tauber, J. 2000, *ApJ*, 540, 886
- Zinnecker, H. & Yorke, H. W. 2007, *ARA&A*, 45, 481