The chemistry of planet-forming disks: a story from inner to outer disk

Temmink, M.

Bibliography

Abgrall, H., Le Bourlot, J., Pineau Des Forets, G., et al. 1992, A&A, 253, 525

Aikawa, Y., van Zadelhoff, G. J., van Dishoeck, E. F., & Herbst, E. 2002, A&A, 386, 622

Akiyama, E., Vorobyov, E. I., Liu, H. B., et al. 2019, AJ, 157, 165

Alexander, R. D., Clarke, C. J., & Pringle, J. E. 2006a, MNRAS, 369, 216

Alexander, R. D., Clarke, C. J., & Pringle, J. E. 2006b, MNRAS, 369, 229

ALMA Partnership, Brogan, C. L., Pérez, L. M., et al. 2015, ApJ, 808, L3

Andrews, S. M. 2020, ARA&A, 58, 483

Andrews, S. M., Huang, J., Pérez, L. M., et al. 2018, ApJ, 869, L41

Ansdell, M., Williams, J. P., van der Marel, N., et al. 2016, ApJ, 828, 46

Arabhavi, A. M., Kamp, I., Henning, T., et al. 2024, Science, 384, 1086

Ardila, D. R., Basri, G., Walter, F. M., Valenti, J. A., & Johns-Krull, C. M. 2002, ApJ, 567, 1013

Argyriou, I., Glasse, A., Law, D. R., et al. 2023, A&A, 675, A111

Armitage, P. J. 2015, arXiv e-prints, arXiv:1509.06382

Arulanantham, N., McClure, M. K., Pontoppidan, K., et al. 2024, ApJ, 965, L13

Arun, R., Mathew, B., Manoj, P., et al. 2019, AJ, 157, 159

Aspin, C., Reipurth, B., Herczeg, G. J., & Capak, P. 2010, ApJ, 719, L50

Astropy Collaboration, Price-Whelan, A. M., Lim, P. L., et al. 2022, ApJ, 935, 167

Astropy Collaboration, Price-Whelan, A. M., Sipőcz, B. M., et al. 2018, AJ, 156, 123

Astropy Collaboration, Robitaille, T. P., Tollerud, E. J., et al. 2013, A&A, 558, A33

Ataiee, S., Baruteau, C., Alibert, Y., & Benz, W. 2018, A&A, 615, A110

Atkinson, R., Baulch, D. L., Cox, R. A., et al. 2006, Atmospheric Chemistry & Physics, 6, 3625

Avenhaus, H., Quanz, S. P., Schmid, H. M., et al. 2014, ApJ, 781, 87

Avni, Y. 1976, ApJ, 210, 642

Bae, J., Hartmann, L., & Zhu, Z. 2015, ApJ, 805, 15

Bae, J., Isella, A., Zhu, Z., et al. 2023, in Astronomical Society of the Pacific Conference Series, Vol. 534, Protostars and Planets VII, ed. S. Inutsuka, Y. Aikawa, T. Muto, K. Tomida, & M. Tamura, 423

Bae, J. & Zhu, Z. 2018, ApJ, 859, 118

Bae, J., Zhu, Z., & Hartmann, L. 2017, ApJ, 850, 201

Balança, C., Spielfiedel, A., & Feautrier, N. 2016, MNRAS, 460, 3766

Balmer, W. O., Follette, K. B., Close, L. M., et al. 2022, AJ, 164, 29

Banzatti, A., Abernathy, K. M., Brittain, S., et al. 2022, AJ, 163, 174

Banzatti, A., Ballering, N., Gasman, D., et al. 2025a, in PRIMA General Observer Science Book Volume 2, ed. A. Moullet, D. Burgarella, T. Kataria, H. Beuther, C. Battersby, M. Cheng, T. Essinger-Hileman, H. Inami, E. Mills, T. Nagao, & S. Unwin, Vol. 2, 314–318

Banzatti, A., Meyer, M. R., Bruderer, S., et al. 2012, ApJ, 745, 90

Banzatti, A., Pascucci, I., Bosman, A. D., et al. 2020, ApJ, 903, 124

Banzatti, A., Pascucci, I., Edwards, S., et al. 2019, ApJ, 870, 76

Banzatti, A. & Pontoppidan, K. M. 2015, ApJ, 809, 167

Banzatti, A., Pontoppidan, K. M., Carr, J. S., et al. 2023a, ApJ, 957, L22

Banzatti, A., Pontoppidan, K. M., Pére Chávez, J., et al. 2023b, AJ, 165, 72

Banzatti, A., Pontoppidan, K. M., Salyk, C., et al. 2017, ApJ, 834, 152

Banzatti, A., Salyk, C., Pontoppidan, K. M., et al. 2025b, AJ, 169, 165

Barvainis, R. 1987, ApJ, 320, 537

Bast, J. E., Brown, J. M., Herczeg, G. J., van Dishoeck, E. F., & Pontoppidan, K. M. 2011, A&A, 527, A119

Benisty, M., Dominik, C., Follette, K., et al. 2023, in Astronomical Society of the Pacific Conference Series, Vol. 534, Protostars and Planets VII, ed. S. Inutsuka, Y. Aikawa, T. Muto, K. Tomida, & M. Tamura, 605

Benisty, M., Juhász, A., Facchini, S., et al. 2018, A&A, 619, A171

Bergin, E. A., Aikawa, Y., Blake, G. A., & van Dishoeck, E. F. 2007, in Protostars and Planets V, ed. B. Reipurth, D. Jewitt, & K. Keil, 751

Bergin, E. A., Cleeves, L. I., Gorti, U., et al. 2013, Nature, 493, 644

Bergin, E. A., Du, F., Cleeves, L. I., et al. 2016, ApJ, 831, 101

Bergin, E. A. & Tafalla, M. 2007, ARA&A, 45, 339

Bergin, E. A. & Williams, J. P. 2017, in Astrophysics and Space Science Library, Vol. 445, Formation, Evolution, and Dynamics of Young Solar Systems, ed. M. Pessah & O. Gressel, 1

Bergner, J. B., Guzmán, V. G., Öberg, K. I., Loomis, R. A., & Pegues, J. 2018, ApJ, 857, 69

Béthune, W., Lesur, G., & Ferreira, J. 2017, A&A, 600, A75

Biller, B., Lacour, S., Juhász, A., et al. 2012, ApJ, 753, L38

Birnstiel, T. 2024, ARA&A, 62, 157

Birnstiel, T., Dullemond, C. P., & Brauer, F. 2010, A&A, 513, A79

Bisschop, S. E., Fraser, H. J., Öberg, K. I., van Dishoeck, E. F., & Schlemmer, S. 2006, A&A, 449, 1297

Bitsch, B., Morbidelli, A., Johansen, A., et al. 2018, A&A, 612, A30

Blandford, R. D. & Payne, D. G. 1982, MNRAS, 199, 883

Blevins, S. M., Pontoppidan, K. M., Banzatti, A., et al. 2016, ApJ, 818, 22

Blum, J. & Wurm, G. 2008, ARA&A, 46, 21

Boehler, Y., Ménard, F., Robert, C. M. T., et al. 2021, A&A, 650, A59

Boehler, Y., Weaver, E., Isella, A., et al. 2017, ApJ, 840, 60

Bohn, A. J., Benisty, M., Perraut, K., et al. 2022, A&A, 658, A183

Boogert, A. C. A., Gerakines, P. A., & Whittet, D. C. B. 2015, ARA&A, 53, 541

Booth, A. S., Calahan, J., Temmink, M., et al. 2026, AJ, 171, 128

Booth, A. S., Ilee, J. D., Walsh, C., et al. 2023, A&A, 669, A53

Booth, A. S., Leemker, M., van Dishoeck, E. F., et al. 2024a, AJ, 167, 164

Booth, A. S., Temmink, M., van Dishoeck, E. F., et al. 2024b, AJ, 167, 165

Booth, A. S., van der Marel, N., Leemker, M., van Dishoeck, E. F., & Ohashi, S. 2021a, A&A, 651, L6

Booth, A. S., Walsh, C., Terwisscha van Scheltinga, J., et al. 2021b, Nature Astronomy, 5, 684

Booth, A. S., Wölfer, L., Temmink, M., et al. 2025, ApJ, 986, L9

Bosman, A. D. & Bergin, E. A. 2021, ApJ, 918, L10

Bosman, A. D., Bergin, E. A., Calahan, J., & Duval, S. E. 2022a, ApJ, 930, L26

Bosman, A. D., Bergin, E. A., Calahan, J. K., & Duval, S. E. 2022b, ApJ, 933, L40

Bosman, A. D., Bergin, E. A., Loomis, R. A., et al. 2021, ApJS, 257, 15

Bosman, A. D., Bruderer, S., & van Dishoeck, E. F. 2017, A&A, 601, A36

Bosman, A. D., Tielens, A. G. G. M., & van Dishoeck, E. F. 2018, A&A, 611, A80

Bouwman, J., Meeus, G., de Koter, A., et al. 2001, A&A, 375, 950

Brandl, B., Bettonvil, F., van Boekel, R., et al. 2021, The Messenger, 182, 22

Brauer, F., Dullemond, C. P., & Henning, T. 2008, A&A, 480, 859

Braun, T. A. M., Yen, H.-W., Koch, P. M., et al. 2021, ApJ, 908, 46

Brittain, S. D., Kamp, I., Meeus, G., Oudmaijer, R. D., & Waters, L. B. F. M. 2023, Space Sci. Rev., 219, 7

Brittain, S. D., Najita, J. R., & Carr, J. S. 2009, ApJ, 702, 85

Brittain, S. D., Simon, T., Najita, J. R., & Rettig, T. W. 2007, ApJ, 659, 685

Brown, J. M., Herczeg, G. J., Pontoppidan, K. M., & van Dishoeck, E. F. 2012, ApJ, 744, 116

Brown, J. M., Pontoppidan, K. M., van Dishoeck, E. F., et al. 2013, ApJ, 770, 94

Brown, W. A. & Bolina, A. S. 2007, MNRAS, 374, 1006

Bruderer, S. 2013, A&A, 559, A46

Bruderer, S., Harsono, D., & van Dishoeck, E. F. 2015, A&A, 575, A94

Bruderer, S., van der Marel, N., van Dishoeck, E. F., & van Kempen, T. A. 2014, A&A, 562, A26

Bruderer, S., van Dishoeck, E. F., Doty, S. D., & Herczeg, G. J. 2012, A&A, 541, A91

Brunken, N. G. C., Booth, A. S., Leemker, M., et al. 2022, A&A, 659, A29

Bushouse, H., Eisenhamer, J., Dencheva, N., et al. 2023a, JWST Calibration Pipeline, Zenodo

Bushouse, H., Eisenhamer, J., Dencheva, N., et al. 2023b, JWST Calibration Pipeline

Bushouse, H., Eisenhamer, J., Dencheva, N., et al. 2024, JWST Calibration Pipeline

Calahan, J. K., Bergin, E., Zhang, K., et al. 2021, ApJ, 908, 8

Calahan, J. K., Bergin, E. A., & Bosman, A. D. 2022, ApJ, 934, L14

Calahan, J. K., Bergin, E. A., van't Hoff, M., et al. 2024, ApJ, 975, 170

Carnall, A. C. 2017, arXiv e-prints, arXiv:1705.05165

Carney, M. T., Fedele, D., Hogerheijde, M. R., et al. 2018, A&A, 614, A106

Carney, M. T., Hogerheijde, M. R., Guzmán, V. V., et al. 2019, A&A, 623, A124

Carney, M. T., Hogerheijde, M. R., Loomis, R. A., et al. 2017, A&A, 605, A21

Carpenter, J., Brogan, C., Iono, D., & Mroczkowski, T. 2023, in Physics and Chemistry of Star Formation: The Dynamical ISM Across Time and Spatial Scales, ed. V. Ossenkopf-Okada, R. Schaaf, I. Breloy, & J. Stutzki, 304

Carr, J. S. & Najita, J. R. 2011, ApJ, 733, 102

Carr, J. S. & Najita, J. R. 2014, ApJ, 788, 66

CASA Team, Bean, B., Bhatnagar, S., et al. 2022, PASP, 134, 114501

Casassus, S., Christiaens, V., Cárcamo, M., et al. 2021, MNRAS, 507, 3789

Casassus, S., van der Plas, G. M., Perez, S., et al. 2013, Nature, 493, 191

Cassen, P. & Moosman, A. 1981, ICARUS, 48, 353

Cazzoletti, P., van Dishoeck, E. F., Visser, R., Facchini, S., & Bruderer, S. 2018, A&A, 609, A93

Charnley, S. B. 1997, ApJ, 481, 396

Chiang, E. I. & Goldreich, P. 1997, ApJ, 490, 368

Christiaens, V., Casassus, S., Perez, S., van der Plas, G., & Ménard, F. 2014, ApJ, 785, L12

Christiaens, V., Gonzalez, C., Farkas, R., et al. 2023, The Journal of Open Source Software, 8, 4774

Claes, R. A. B., Manara, C. F., Garcia-Lopez, R., et al. 2022, A&A, 664, L7

Clarke, C. J., Tazzari, M., Juhasz, A., et al. 2018, ApJ, 866, L6

Cleeves, L. I., Bergin, E. A., Qi, C., Adams, F. C., & Öberg, K. I. 2015, ApJ, 799, 204

Cleeves, L. I., Loomis, R. A., Teague, R., et al. 2021, ApJ, 911, 29

Cleeves, L. I., Öberg, K. I., Wilner, D. J., et al. 2018, ApJ, 865, 155

Colangeli, L., Henning, T., Brucato, J. R., et al. 2003, A&A Rev., 11, 97

Collings, M. P., Anderson, M. A., Chen, R., et al. 2004, MNRAS, 354, 1133

Colmenares, M. J., Bergin, E. A., Salyk, C., et al. 2024, ApJ, 977, 173

Cossins, P., Lodato, G., & Clarke, C. J. 2009, MNRAS, 393, 1157

Crnkovic-Rubsamen, I., Zhu, Z., & Stone, J. M. 2015, MNRAS, 450, 4285

Cuppen, H. M., Linnartz, H., & Ioppolo, S. 2024, ARA&A, 62, 243

Cutri, R. M., Wright, E. L., Conrow, T., et al. 2013, Explanatory Supplement to the AllWISE Data Release Products, Explanatory Supplement to the AllWISE Data Release Products, by R. M. Cutri et al.

Cuzzi, J. N. & Zahnle, K. J. 2004, ApJ, 614, 490

Czekala, I., Loomis, R. A., Teague, R., et al. 2021, ApJS, 257, 2

D'Alessio, P., Cantö, J., Calvet, N., & Lizano, S. 1998, ApJ, 500, 411

Dartois, E., Dutrey, A., & Guilloteau, S. 2003, A&A, 399, 773

Dawson, R. I. & Johnson, J. A. 2018, ARA&A, 56, 175

Dong, R., Li, S., Chiang, E., & Li, H. 2017, ApJ, 843, 127

Dong, R., Zhu, Z., Rafikov, R. R., & Stone, J. M. 2015, ApJ, 809, L5

Dorn, R. J., Anglada-Escude, G., Baade, D., et al. 2014, The Messenger, 156, 7

Dorn, R. J., Bristow, P., Smoker, J. V., et al. 2023, A&A, 671, A24

Draine, B. T. 2003, ARA&A, 41, 241

Drążkowska, J., Alibert, Y., & Moore, B. 2016, A&A, 594, A105

Drążkowska, J., Bitsch, B., Lambrechts, M., et al. 2023, in Astronomical Society of the Pacific Conference Series, Vol. 534, Protostars and Planets VII, ed. S. Inutsuka, Y. Aikawa, T. Muto, K. Tomida, & M. Tamura, 717

Dubrulle, B., Morfill, G., & Sterzik, M. 1995, ICARUS, 114, 237

Duchêne, G., Ménard, F., Stapelfeldt, K., & Duvert, G. 2003, A&A, 400, 559

Dullemond, C. P. & Dominik, C. 2004, A&A, 417, 159

Dullemond, C. P., Dominik, C., & Natta, A. 2001, ApJ, 560, 957

Easterwood, W., Kalyaan, A., & Banzatti, A. 2024, ApJ, 977, 21

Ehrenfreund, P., Boogert, A. C. A., Gerakines, P. A., Tielens, A. G. G. M., & van Dishoeck, E. F. 1997, A&A, 328, 649

Eistrup, C., Walsh, C., & van Dishoeck, E. F. 2016, A&A, 595, A83

Erb, D. 2022, pybaselines: A Python library of algorithms for the baseline correction of experimental data, Zenodo

Ercolano, B. & Pascucci, I. 2017, Royal Society Open Science, 4, 170114

Espaillat, C., Muzerolle, J., Najita, J., et al. 2014, in Protostars and Planets VI, ed. H. Beuther, R. S. Klessen, C. P. Dullemond, & T. Henning, 497–520

Fabian, D., Jäger, C., Henning, T., Dorschner, J., & Mutschke, H. 2000, A&A, 364, 282

Facchini, S., Birnstiel, T., Bruderer, S., & van Dishoeck, E. F. 2017, A&A, 605, A16

Facchini, S., Teague, R., Bae, J., et al. 2021, AJ, 162, 99

Facchini, S., van Dishoeck, E. F., Manara, C. F., et al. 2019, A&A, 626, L2

Fairlamb, J. R., Oudmaijer, R. D., Mendigutía, I., Ilee, J. D., & van den Ancker, M. E. 2015, MNRAS, 453, 976

Fang, M., Pascucci, I., Edwards, S., et al. 2018, ApJ, 868, 28

Fedele, D. & Favre, C. 2020, A&A, 638, A110

Fischer, W. J., Hillenbrand, L. A., Herczeg, G. J., et al. 2023, in Astronomical Society of the Pacific Conference Series, Vol. 534, Protostars and Planets VII, ed. S. Inutsuka, Y. Aikawa, T. Muto, K. Tomida, & M. Tamura, 355

Flaherty, K., Hughes, A. M., Simon, J. B., et al. 2020, ApJ, 895, 109

Flaherty, K., Hughes, A. M., Simon, J. B., et al. 2024, MNRAS, 532, 363

Flaherty, K. M., Hughes, A. M., Rose, S. C., et al. 2017, ApJ, 843, 150

Flaherty, K. M., Hughes, A. M., Rosenfeld, K. A., et al. 2015, ApJ, 813, 99

Flock, M., Nelson, R. P., Turner, N. J., et al. 2017, ApJ, 850, 131

Flock, M., Turner, N. J., Nelson, R. P., et al. 2020, ApJ, 897, 155

Fockenberg, C. & Preses, J. M. 2002, Journal of Physical Chemistry A, 106, 2924

Foreman-Mackey, D., Hogg, D. W., Lang, D., & Goodman, J. 2013, PASP, 125, 306

Francis, L. & van der Marel, N. 2020, ApJ, 892, 111

Francis, L., van Gelder, M. L., van Dishoeck, E. F., et al. 2024, arXiv e-prints, arXiv:2401.06880

Fraser, H. J., Collings, M. P., McCoustra, M. R. S., & Williams, D. A. 2001, MNRAS, 327, 1165

Fuchs, G. W., Cuppen, H. M., Ioppolo, S., et al. 2009, A&A, 505, 629

Fujiwara, H., Honda, M., Kataza, H., et al. 2006, ApJ, 644, L133

Fukagawa, M., Tamura, M., Itoh, Y., et al. 2006, ApJ, 636, L153

Fukagawa, M., Tsukagoshi, T., Momose, M., et al. 2013, PASJ, 65, L14

Furuya, K. 2024, arXiv e-prints, arXiv:2408.02958

Furuya, K., Tsukagoshi, T., Qi, C., et al. 2022, ApJ, 926, 148

Gaia Collaboration, Brown, A. G. A., Vallenari, A., et al. 2018, A&A, 616, A1

Gaia Collaboration, Vallenari, A., Brown, A. G. A., et al. 2023, A&A, 674, A1

Gammie, C. F. 1996, ApJ, 457, 355

Gangi, M., Antoniucci, S., Biazzo, K., et al. 2022, A&A, 667, A124

Garg, H., Pinte, C., Christiaens, V., et al. 2021, MNRAS, 504, 782

Garufi, A., Podio, L., Codella, C., et al. 2022, A&A, 658, A104

Garufi, A., Podio, L., Kamp, I., et al. 2014, A&A, 567, A141

Gasman, D., Temmink, M., van Dishoeck, E. F., et al. 2025, A&A, 694, A147

Gasman, D., van Dishoeck, E. F., Grant, S. L., et al. 2023, A&A, 679, A117

Gerakines, P. A., Whittet, D. C. B., Ehrenfreund, P., et al. 1999, ApJ, 522, 357

Ginski, C., Facchini, S., Huang, J., et al. 2021, ApJ, 908, L25

Glass, I. S. 1999, Handbook of Infrared Astronomy

Glassgold, A. E., Najita, J., & Igea, J. 1997, ApJ, 480, 344

Glenn, J., Meixner, M., Bradford, C. M., et al. 2025, Journal of Astronomical Telescopes, Instruments, and Systems, 11, 031628

Godon, P. & Livio, M. 1999, ApJ, 523, 350

Goldsmith, P. F. & Langer, W. D. 1999, ApJ, 517, 209

Gomez Gonzalez, C. A., Wertz, O., Absil, O., et al. 2017, AJ, 154, 7

Gordon, I. E., Rothman, L. S., Hargreaves, R. J., et al. 2022, J. Quant. Spectr. Rad. Transf., 277, 107949

Gould, R. J. & Salpeter, E. E. 1963, ApJ, 138, 393

Grant, S. L., Bettoni, G., Banzatti, A., et al. 2023a, arXiv e-prints, arXiv:2309.03888

Grant, S. L., Temmink, M., van Dishoeck, E. F., et al. 2025, A&A, 702, A126

Grant, S. L., van Dishoeck, E. F., Tabone, B., et al. 2023b, ApJ, 947, L6

GRAVITY Collaboration, Perraut, K., Labadie, L., et al. 2021, A&A, 655, A73

Greenwood, A. J., Kamp, I., Waters, L. B. F. M., Woitke, P., & Thi, W. F. 2019, A&A, 626, A6

Guidi, G., Isella, A., Testi, L., et al. 2022, A&A, 664, A137

Guillot, T., Ida, S., & Ormel, C. W. 2014, A&A, 572, A72

Guzmán, V. V., Öberg, K. I., Carpenter, J., et al. 2018, ApJ, 864, 170

Haffert, S. Y., Bohn, A. J., de Boer, J., et al. 2019, Nature Astronomy, 3, 749

Hammer, M., Kratter, K. M., & Lin, M.-K. 2017, MNRAS, 466, 3533

Hammer, M. & Lin, M.-K. 2023, MNRAS, 525, 123

Hammer, M., Lin, M.-K., Kratter, K. M., & Pinilla, P. 2021, MNRAS, 504, 3963

Hammer, M., Pinilla, P., Kratter, K. M., & Lin, M.-K. 2019, MNRAS, 482, 3609

Harris, C. R., Millman, K. J., van der Walt, S. J., et al. 2020, Nature, 585, 357

Harsono, D., Bjerkeli, P., van der Wiel, M. H. D., et al. 2018, Nature Astronomy, 2, 646

Harsono, D., Bruderer, S., & van Dishoeck, E. F. 2015, A&A, 582, A41

Hartmann, L., Calvet, N., Gullbring, E., & D'Alessio, P. 1998, ApJ, 495, 385

Hasegawa, T. I., Herbst, E., & Leung, C. M. 1992, ApJS, 82, 167

Hawley, J. F. 2001, ApJ, 554, 534

Heays, A. N., Bosman, A. D., & van Dishoeck, E. F. 2017, A&A, 602, A105

Henning, T. 2010, ARA&A, 48, 21

Henning, T., Kamp, I., Samland, M., et al. 2024, PASP, 136, 054302

Herbig, G. H. 1960, ApJS, 4, 337

Herbst, E. & Klemperer, W. 1973, ApJ, 185, 505

Herbst, E. & van Dishoeck, E. F. 2009, ARA&A, 47, 427

Herczeg, G. J., Brown, J. M., van Dishoeck, E. F., & Pontoppidan, K. M. 2011, A&A, 533, A112

Herczeg, G. J. & Hillenbrand, L. A. 2014, ApJ, 786, 97

Hernández-Vera, C., Guzmán, V. V., Artur de la Villarmois, E., et al. 2024, ApJ, 967, 68

Ho, P. T. P., Moran, J. M., & Lo, K. Y. 2004, ApJ, 616, L1

Hollenbach, D., Johnstone, D., Lizano, S., & Shu, F. 1994, ApJ, 428, 654

Honda, M., Inoue, A. K., Fukagawa, M., et al. 2009, ApJ, 690, L110

Houck, J. R., Roellig, T. L., van Cleve, J., et al. 2004, ApJS, 154, 18

Houge, A., Krijt, S., Banzatti, A., et al. 2025, MNRAS, 537, 691

Huang, J., Andrews, S. M., Pérez, L. M., et al. 2018a, ApJ, 869, L43

Huang, J., Bergin, E. A., Öberg, K. I., et al. 2021, ApJS, 257, 19

Huang, P., Isella, A., Li, H., Li, S., & Ji, J. 2018b, ApJ, 867, 3

Hunter, J. D. 2007, Computing in Science & Engineering, 9, 90

Hunziker, S., Schmid, H. M., Ma, J., et al. 2021, A&A, 648, A110

Ikoma, M. & Kobayashi, H. 2025, ARA&A, 63, 217

Ilee, J. D., Forgan, D. H., Evans, M. G., et al. 2017, MNRAS, 472, 189

Ilee, J. D., Walsh, C., Booth, A. S., et al. 2021, ApJS, 257, 9

Ilee, J. D., Walsh, C., & Calahan, J. K. 2026, AJ, 171, 3

Isella, A., Huang, J., Andrews, S. M., et al. 2018, ApJ, 869, L49

Itoh, Y., Oasa, Y., Kudo, T., et al. 2014, Research in Astronomy and Astrophysics, 14, 1438

Izquierdo, A. F., Facchini, S., Rosotti, G. P., van Dishoeck, E. F., & Testi, L. 2022, ApJ, 928, 2

Jakobsen, P., Ferruit, P., Alves de Oliveira, C., et al. 2022, A&A, 661, A80

Jang, H., Waters, R., Kaeufer, T., et al. 2024, A&A, 691, A148

Jansen, D. J., Spaans, M., Hogerheijde, M. R., & van Dishoeck, E. F. 1995, A&A, 303, 541

Jennings, J., Booth, R. A., Tazzari, M., Clarke, C. J., & Rosotti, G. P. 2022a, MNRAS, 509, 2780

Jennings, J., Booth, R. A., Tazzari, M., Rosotti, G. P., & Clarke, C. J. 2020, MNRAS, 495, 3209

Jennings, J., Tazzari, M., Clarke, C. J., Booth, R. A., & Rosotti, G. P. 2022b, MNRAS, 514, 6053

Johansen, A. & Lacerda, P. 2010, MNRAS, 404, 475

Johansen, A. & Lambrechts, M. 2017, Annual Review of Earth and Planetary Sciences, 45, 359

Johansen, A., Youdin, A., & Klahr, H. 2009, ApJ, 697, 1269

Johnstone, D., Boonman, A. M. S., & van Dishoeck, E. F. 2003, A&A, 412, 157

Juhász, A., Bouwman, J., Henning, T., et al. 2010, ApJ, 721, 431

Kaeufer, T., Min, M., Woitke, P., Kamp, I., & Arabhavi, A. M. 2024, A&A, 687, A209

Kaeufl, H.-U., Ballester, P., Biereichel, P., et al. 2004, in Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, Vol. 5492, Ground-based Instrumentation for Astronomy, ed. A. F. M. Moorwood & M. Iye, 1218–1227

Kalyaan, A., Pinilla, P., Krijt, S., et al. 2023, ApJ, 954, 66

Kalyaan, A., Pinilla, P., Krijt, S., Mulders, G. D., & Banzatti, A. 2021, ApJ, 921, 84

Kama, M., Bruderer, S., van Dishoeck, E. F., et al. 2016, A&A, 592, A83

Kama, M., Trapman, L., Fedele, D., et al. 2020, A&A, 634, A88

Kamp, I., Henning, T., Arabhavi, A. M., et al. 2023, Faraday Discussions, 245, 112

Kamp, I., Thi, W. F., Meeus, G., et al. 2013, A&A, 559, A24

Kastner, J. H., Qi, C., Dickson-Vandervelde, D. A., et al. 2018, ApJ, 863, 106

Kastner, J. H., Zuckerman, B., Weintraub, D. A., & Forveille, T. 1997, Science, 277, 67

Kayanuma, M., Shoji, M., Furuya, K., et al. 2019, Chemical Physics Letters, 714, 137

Kenyon, S. J., Dobrzycka, D., & Hartmann, L. 1994, AJ, 108, 1872

Keppler, M., Benisty, M., Müller, A., et al. 2018, A&A, 617, A44

Keppler, M., Penzlin, A., Benisty, M., et al. 2020, A&A, 639, A62

Kessler, M. F., Steinz, J. A., Anderegg, M. E., et al. 1996, A&A, 315, L27

Kley, W. 1999, MNRAS, 303, 696

Kluyver, T., Ragan-Kelley, B., Pérez, F., et al. 2016, in Positioning and Power in Academic Publishing: Players, Agents and Agendas, ed. F. Loizides & B. Schmidt, IOS Press, 87 – 90

Kokubo, E. & Ida, S. 1996, ICARUS, 123, 180

Kokubo, E. & Ida, S. 2002, ApJ, 581, 666

Kóspál, Á., Ábrahám, P., Diehl, L., et al. 2023, ApJ, 945, L7

Kraus, S., Kreplin, A., Fukugawa, M., et al. 2017, ApJ, 848, L11

Krist, J. E., Stapelfeldt, K. R., & Watson, A. M. 2002, ApJ, 570, 785

Krolikowski, D. M., Kraus, A. L., & Rizzuto, A. C. 2021, AJ, 162, 110

Kuznetsova, A., Bae, J., Hartmann, L., & Mac Low, M.-M. 2022, ApJ, 928, 92

Labiano, A., Argyriou, I., Álvarez-Márquez, J., et al. 2021, A&A, 656, A57

Lacour, S., Biller, B., Cheetham, A., et al. 2016, A&A, 590, A90

Lacy, J. H., Sneden, C., Kim, H., & Jaffe, D. T. 2017, ApJ, 838, 66

Lambrechts, M. & Johansen, A. 2012, A&A, 544, A32

Lambrechts, M., Johansen, A., & Morbidelli, A. 2014, A&A, 572, A35

Law, C. J., Alarcón, F., Cleeves, L. I., Öberg, K. I., & Paneque-Carreño, T. 2023a, ApJ, 959, L27

Law, C. J., Benisty, M., Facchini, S., et al. 2024, ApJ, 964, 190

Law, C. J., Teague, R., Loomis, R. A., et al. 2021, ApJS, 257, 4

Law, C. J., Teague, R., Öberg, K. I., et al. 2023b, ApJ, 948, 60

Le Gal, R., Öberg, K. I., Loomis, R. A., Pegues, J., & Bergner, J. B. 2019, ApJ, 876, 72

Le Gal, R., Öberg, K. I., Teague, R., et al. 2021, ApJS, 257, 12

Lee, J.-E., Lee, S., Baek, G., et al. 2019, Nature Astronomy, 3, 314

Leemker, M., Booth, A. S., van Dishoeck, E. F., et al. 2022, A&A, 663, A23

Leemker, M., Booth, A. S., van Dishoeck, E. F., et al. 2023, A&A, 673, A7

Leemker, M., Tobin, J. J., Facchini, S., et al. 2025, Nature Astronomy, 9, 1486

Leemker, M., van't Hoff, M. L. R., Trapman, L., et al. 2021, A&A, 646, A3

Lesur, G., Ferreira, J., & Ogilvie, G. I. 2013, A&A, 550, A61

Lesur, G., Flock, M., Ercolano, B., et al. 2023, in Astronomical Society of the Pacific Conference Series, Vol. 534, Protostars and Planets VII, ed. S. Inutsuka, Y. Aikawa, T. Muto, K. Tomida, & M. Tamura, 465

Lesur, G., Hennebelle, P., & Fromang, S. 2015, A&A, 582, L9

Li, H., Finn, J. M., Lovelace, R. V. E., & Colgate, S. A. 2000, ApJ, 533, 1023

Lienert, J. L., Bitsch, B., & Henning, T. 2024, A&A, 691, A72

Lissauer, J. J. 1993, ARA&A, 31, 129

Long, F., Andrews, S. M., Zhang, S., et al. 2022, ApJ, 937, L1

Long, F., Herczeg, G. J., Harsono, D., et al. 2019, ApJ, 882, 49

Long, F., Pinilla, P., Herczeg, G. J., et al. 2018, ApJ, 869, 17

Loomis, R. A., Cleeves, L. I., Öberg, K. I., et al. 2018, ApJ, 859, 131

Loomis, R. A., Cleeves, L. I., Öberg, K. I., Guzman, V. V., & Andrews, S. M. 2015, ApJ, 809, L25

Loomis, R. A., Facchini, S., Benisty, M., et al. 2025, ApJ, 984, L7

Lovelace, R. V. E. & Hohlfeld, R. G. 2013, MNRAS, 429, 529

Lovelace, R. V. E., Li, H., Colgate, S. A., & Nelson, A. F. 1999, ApJ, 513, 805

Lovelace, R. V. E. & Romanova, M. M. 2014, Fluid Dynamics Research, 46, 041401

Luhman, K. L. 2012, ARA&A, 50, 65

Luhman, K. L. 2023, AJ, 165, 37

Lynden-Bell, D. & Pringle, J. E. 1974, MNRAS, 168, 603

Lyra, W., Johansen, A., Zsom, A., Klahr, H., & Piskunov, N. 2009, A&A, 497, 869

Mah, J., Bitsch, B., Pascucci, I., & Henning, T. 2023, A&A, 677, L7

Mah, J., Savvidou, S., & Bitsch, B. 2024, A&A, 686, L17

Malfait, K., Waelkens, C., Waters, L. B. F. M., et al. 1998, A&A, 332, L25

Mallaney, P., Banzatti, A., Salyk, C., et al. 2026, arXiv e-prints, arXiv:2601.02344

Mamajek, E. E. 2009, in American Institute of Physics Conference Series, Vol. 1158, Exoplanets and Disks: Their Formation and Diversity, ed. T. Usuda, M. Tamura, & M. Ishii (AIP), 3–10

Manara, C. F., Ansdell, M., Rosotti, G. P., et al. 2023, in Astronomical Society of the Pacific Conference Series, Vol. 534, Protostars and Planets VII, ed. S. Inutsuka, Y. Aikawa, T. Muto, K. Tomida, & M. Tamura, 539

Manara, C. F., Fedele, D., Herczeg, G. J., & Teixeira, P. S. 2016, A&A, 585, A136

Mandell, A. M., Bast, J., van Dishoeck, E. F., et al. 2012, ApJ, 747, 92

Marino, S., Casassus, S., Perez, S., et al. 2015a, ApJ, 813, 76

Marino, S., Perez, S., & Casassus, S. 2015b, ApJ, 798, L44

Mayama, S., Pérez, S., Kusakabe, N., et al. 2020, AJ, 159, 12

McClure, M. K., Bergin, E. A., Cleeves, L. I., et al. 2016, ApJ, 831, 167

McGuire, B. A. 2022, ApJS, 259, 30

McKee, C. F. & Ostriker, E. C. 2007, ARA&A, 45, 565

McLean, I. S., Becklin, E. E., Bendiksen, O., et al. 1998, in Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, Vol. 3354, Infrared Astronomical Instrumentation, ed. A. M. Fowler, 566–578

McMullin, J. P., Waters, B., Schiebel, D., Young, W., & Golap, K. 2007, in Astronomical Society of the Pacific Conference Series, Vol. 376, Astronomical Data Analysis Software and Systems XVI, ed. R. A. Shaw, F. Hill, & D. J. Bell, 127

Meheut, H., Lovelace, R. V. E., & Lai, D. 2013, MNRAS, 430, 1988

Meheut, H., Meliani, Z., Varniere, P., & Benz, W. 2012a, A&A, 545, A134

Meheut, H., Yu, C., & Lai, D. 2012b, MNRAS, 422, 2399

Meijerink, R., Pontoppidan, K. M., Blake, G. A., Poelman, D. R., & Dullemond, C. P. 2009, ApJ, 704, 1471

Ménard, F., Cuello, N., Ginski, C., et al. 2020, A&A, 639, L1

Milam, S. N., Savage, C., Brewster, M. A., Ziurys, L. M., & Wyckoff, S. 2005, ApJ, 634, 1126

Millar, T. J. & Nejad, L. A. M. 1985, MNRAS, 217, 507

Millar, T. J., Walsh, C., Cordiner, M. A., Ní Chuimín, R., & Herbst, E. 2007, ApJ, 662, L87

Min, M., Bouwman, J., Dominik, C., et al. 2016, A&A, 593, A11

Minissale, M., Aikawa, Y., Bergin, E., et al. 2022, ACS Earth and Space Chemistry, 6, 597

Miotello, A., Facchini, S., van Dishoeck, E. F., et al. 2019, A&A, 631, A69

Miotello, A., Kamp, I., Birnstiel, T., Cleeves, L. C., & Kataoka, A. 2023, in Astronomical Society of the Pacific Conference Series, Vol. 534, Protostars and Planets VII, ed. S. Inutsuka, Y. Aikawa, T. Muto, K. Tomida, & M. Tamura, 501

Mollière, P., Molyarova, T., Bitsch, B., et al. 2022, ApJ, 934, 74

Montesinos, M., Perez, S., Casassus, S., et al. 2016, ApJ, 823, L8

Morbidelli, A., Lunine, J. I., O'Brien, D. P., Raymond, S. N., & Walsh, K. J. 2012, Annual Review of Earth and Planetary Sciences, 40, 251

Mulders, G. D., Ciesla, F. J., Min, M., & Pascucci, I. 2015, ApJ, 807, 9

Müller, A., Keppler, M., Henning, T., et al. 2018, A&A, 617, L2

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

Najita, J. R., Carr, J. S., Salyk, C., et al. 2018, ApJ, 862, 122

Najita, J. R., Carr, J. S., Strom, S. E., et al. 2010, ApJ, 712, 274

Najita, J. R., Strom, S. E., & Muzerolle, J. 2007, MNRAS, 378, 369

Nazari, P., Tabone, B., & Rosotti, G. P. 2023, A&A, 671, A107

Newville, M., Stensitzki, T., Allen, D. B., & Ingargiola, A. 2014, LMFIT: Non-Linear Least-Square Minimization and Curve-Fitting for Python

Nguyen, D. C., Brandeker, A., van Kerkwijk, M. H., & Jayawardhana, R. 2012, ApJ, 745, 119

Noble, J. A., Theule, P., Mispelaer, F., et al. 2012, A&A, 543, A5

Öberg, K. I. & Bergin, E. A. 2021, Phys. Rep., 893, 1

Öberg, K. I., Facchini, S., & Anderson, D. E. 2023, ARA&A, 61, 287

Öberg, K. I., Furuya, K., Loomis, R., et al. 2015, ApJ, 810, 112

Öberg, K. I., Guzmán, V. V., Walsh, C., et al. 2021, ApJS, 257, 1

Öberg, K. I., Qi, C., Fogel, J. K. J., et al. 2010, ApJ, 720, 480

Öberg, K. I., Qi, C., Wilner, D. J., & Andrews, S. M. 2011, ApJ, 743, 152

Ohashi, N. 2008, AP&SS, 313, 101

Ohashi, S., Kataoka, A., van der Marel, N., et al. 2020, ApJ, 900, 81

Olofsson, J., Augereau, J.-C., van Dishoeck, E. F., et al. 2009, A&A, 507, 327

Ormel, C. W. & Klahr, H. H. 2010, A&A, 520, A43

Owen, J. E. & Kollmeier, J. A. 2017, MNRAS, 467, 3379

pandas development team, T. 2020, pandas-dev/pandas: Pandas

Paneque-Carreño, T., Izquierdo, A. F., Teague, R., et al. 2024, A&A, 684, A174

Paneque-Carreño, T., Miotello, A., van Dishoeck, E. F., et al. 2023, A&A, 669, A126

Pascucci, I., Apai, D., Hardegree-Ullman, E. E., et al. 2008, ApJ, 673, 477

Pascucci, I., Cabrit, S., Edwards, S., et al. 2023, in Astronomical Society of the Pacific Conference Series, Vol. 534, Protostars and Planets VII, ed. S. Inutsuka, Y. Aikawa, T. Muto, K. Tomida, & M. Tamura, 567

Pearson, T. J. 1999, in Astronomical Society of the Pacific Conference Series, Vol. 180, Synthesis Imaging in Radio Astronomy II, ed. G. B. Taylor, C. L. Carilli, & R. A. Perley, 335

Pegues, J., Öberg, K. I., Bergner, J. B., et al. 2020, ApJ, 890, 142

Penteado, E. M., Walsh, C., & Cuppen, H. M. 2017, ApJ, 844, 71

Pérez, F. & Granger, B. E. 2007, Computing in Science and Engineering, 9, 21

Pérez, L. M., Isella, A., Carpenter, J. M., & Chandler, C. J. 2014, ApJ, 783, L13

Perez, S., Dunhill, A., Casassus, S., et al. 2015, ApJ, 811, L5

Perotti, G., Christiaens, V., Henning, T., et al. 2023, Nature, 620, 516

Perrero, J., Enrique-Romero, J., Ferrero, S., et al. 2022, ApJ, 938, 158

Pilbratt, G. L., Riedinger, J. R., Passvogel, T., et al. 2010, A&A, 518, L1

Pinilla, P. 2022, European Physical Journal Plus, 137, 1206

Pinilla, P., Benisty, M., & Birnstiel, T. 2012a, A&A, 545, A81

Pinilla, P., Benisty, M., de Boer, J., et al. 2018, ApJ, 868, 85

Pinilla, P., Benisty, M., Waters, R., Bae, J., & Facchini, S. 2024, A&A, 686, A135

Pinilla, P., Birnstiel, T., Ricci, L., et al. 2012b, A&A, 538, A114

Pinte, C., van der Plas, G., Ménard, F., et al. 2019, Nature Astronomy, 3, 1109

Pollack, J. B., Hubickyj, O., Bodenheimer, P., et al. 1996, ICARUS, 124, 62

Pontoppidan, K., Battersby, C., Kataria, T., et al. 2025, in American Astronomical Society Meeting Abstracts, Vol. 245, American Astronomical Society Meeting Abstracts #245, 209.07

Pontoppidan, K. M., Blake, G. A., & Smette, A. 2011, ApJ, 733, 84

Pontoppidan, K. M., Blake, G. A., van Dishoeck, E. F., et al. 2008a, ApJ, 684, 1323

Pontoppidan, K. M., Boogert, A. C. A., Fraser, H. J., et al. 2008b, ApJ, 678, 1005

Pontoppidan, K. M., Salyk, C., Banzatti, A., et al. 2024, ApJ, 963, 158

Pontoppidan, K. M., Salyk, C., Bergin, E. A., et al. 2014, in Protostars and Planets VI, ed. H. Beuther, R. S. Klessen, C. P. Dullemond, & T. Henning, 363–385

Pontoppidan, K. M., Salyk, C., Blake, G. A., et al. 2010, ApJ, 720, 887

Press, W. H., Teukolsky, S. A., Vetterling, W. T., & Flannery, B. P. 1992, Numerical recipes in C. The art of scientific computing

Price, D. J., Cuello, N., Pinte, C., et al. 2018, MNRAS, 477, 1270

Pringle, J. E. 1981, ARA&A, 19, 137

Qi, C., Öberg, K. I., & Wilner, D. J. 2013, ApJ, 765, 34

Rab, C., Kamp, I., Dominik, C., et al. 2020, A&A, 642, A165

Rabli, D. & Flower, D. R. 2010, MNRAS, 406, 95

Raettig, N., Lyra, W., & Klahr, H. 2021, ApJ, 913, 92

Rampinelli, L., Facchini, S., Leemker, M., et al. 2024, A&A, 689, A65

Rayner, J., Tokunaga, A., Jaffe, D., et al. 2022, PASP, 134, 015002

Rayner, J., Tokunaga, A., Jaffe, D., et al. 2016, in Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, Vol. 9908, Ground-based and Airborne Instrumentation for Astronomy VI, ed. C. J. Evans, L. Simard, & H. Takami, 990884

Regály, Z., Juhász, A., Sándor, Z., & Dullemond, C. P. 2012, MNRAS, 419, 1701

Regály, Z., Kadam, K., & Dullemond, C. P. 2021, MNRAS, 506, 2685

Rice, W. K. M., Lodato, G., Pringle, J. E., Armitage, P. J., & Bonnell, I. A. 2004, MNRAS, 355, 543

Rich, E. A., Wisniewski, J. P., Currie, T., et al. 2019, ApJ, 875, 38

Rieke, G. H., Wright, G. S., Böker, T., et al. 2015, PASP, 127, 584

Rigby, J., Perrin, M., McElwain, M., et al. 2023, PASP, 135, 048001

Roccatagliata, V., Franciosini, E., Sacco, G. G., Randich, S., & Sicilia-Aguilar, A. 2020, A&A, 638, A85

Romero-Mirza, C. E., Banzatti, A., Öberg, K. I., et al. 2024a, ApJ, 975, 78

Romero-Mirza, C. E., Öberg, K. I., Banzatti, A., et al. 2024b, ApJ, 964, 36

Romero-Mirza, C. E., Öberg, K. I., Law, C. J., et al. 2023, ApJ, 943, 35

Rometsch, T., Ziampras, A., Kley, W., & Béthune, W. 2021, A&A, 656, A130

Rosotti, G. P., Benisty, M., Juhász, A., et al. 2020, MNRAS, 491, 1335

Rosotti, G. P., Ilee, J. D., Facchini, S., et al. 2021, MNRAS, 501, 3427

Rota, A. A., Meijerhof, J. D., van der Marel, N., et al. 2024, A&A, 684, A134

Salinas, V. N., Hogerheijde, M. R., Mathews, G. S., et al. 2017, A&A, 606, A125

Salyk, C., Blake, G. A., Boogert, A. C. A., & Brown, J. M. 2009, ApJ, 699, 330

Salyk, C., Blake, G. A., Boogert, A. C. A., & Brown, J. M. 2011a, ApJ, 743, 112

Salyk, C. & Gasman, D. 2025, in PRIMA General Observer Science Book Volume 2, ed. A. Moullet, D. Burgarella, T. Kataria, H. Beuther, C. Battersby, M. Cheng, T. Essinger-Hileman, H. Inami, E. Mills, T. Nagao, & S. Unwin, Vol. 2, 476–480

Salyk, C., Lacy, J., Richter, M., et al. 2019, ApJ, 874, 24

Salyk, C., Pontoppidan, K. M., Banzatti, A., et al. 2025, AJ, 169, 184

Salyk, C., Pontoppidan, K. M., Blake, G. A., et al. 2008, ApJ, 676, L49

Salyk, C., Pontoppidan, K. M., Blake, G. A., Najita, J. R., & Carr, J. S. 2011b, ApJ, 731, 130

Santos, J. C., Chuang, K.-J., Lamberts, T., et al. 2022, ApJ, 931, L33

Savitzky, A. & Golay, M. J. E. 1964, Analytical Chemistry, 36, 1627

Schöier, F. L., van der Tak, F. F. S., van Dishoeck, E. F., & Black, J. H. 2005, A&A, 432, 369

Schwarz, K. R., Henning, T., Christiaens, V., et al. 2024, ApJ, 962, 8

Schwarz, K. R., Samland, M., Olofsson, G., et al. 2025, ApJ, 980, 148

Sellek, A. D., Vlasblom, M., & van Dishoeck, E. F. 2025, A&A, 694, A79

Semenov, D., Favre, C., Fedele, D., et al. 2018, A&A, 617, A28

Semenov, D., Wiebe, D., & Henning, T. 2006, ApJ, 647, L57

Shakura, N. I. & Sunyaev, R. A. 1973, A&A, 24, 337

Shu, F. H., Adams, F. C., & Lizano, S. 1987, ARA&A, 25, 23

Simon, M., Guilloteau, S., Di Folco, E., et al. 2017, ApJ, 844, 158

Skrutskie, M. F., Dutkevitch, D., Strom, S. E., et al. 1990, AJ, 99, 1187

Smith, S. A., Romero-Mirza, C. E., Banzatti, A., et al. 2025, ApJ, 984, L51

Speedie, J., Dong, R., Hall, C., et al. 2024, Nature, 633, 58

Speedie, J., Dong, R., Teague, R., et al. 2025, ApJ, 981, L30

Stacey, G. & POEMM Science Team. 2025, in American Astronomical Society Meeting Abstracts, Vol. 245, American Astronomical Society Meeting Abstracts #245, 441.05

Stadler, J., Benisty, M., Zagaria, F., et al. 2026, arXiv e-prints, arXiv:2601.15262

Stapper, L. M., Hogerheijde, M. R., van Dishoeck, E. F., et al. 2024, A&A, 682, A149

Stapper, L. M., Hogerheijde, M. R., van Dishoeck, E. F., & Mentel, R. 2022, A&A, 658, A112

Stecher, T. P. & Williams, D. A. 1967, ApJ, 149, L29

Sternberg, A. & Dalgarno, A. 1995, ApJS, 99, 565

Stevenson, D. J. & Lunine, J. I. 1988, ICARUS, 75, 146

Stolker, T., Kammerer, J., Benisty, M., et al. 2024, A&A, 682, A101

Strom, K. M., Strom, S. E., Edwards, S., Cabrit, S., & Skrutskie, M. F. 1989, AJ, 97, 1451

Sturm, J. A., McClure, M. K., Beck, T. L., et al. 2023a, A&A, 679, A138

Sturm, J. A., McClure, M. K., Bergner, J. B., et al. 2023b, A&A, 677, A18

Sturm, J. A., McClure, M. K., Law, C. J., et al. 2023c, A&A, 677, A17

Su, Z. & Bai, X.-N. 2024, ApJ, 975, 126

Tabone, B., Bettoni, G., van Dishoeck, E. F., et al. 2023, Nature Astronomy, 7, 805

Tabone, B., Rosotti, G. P., Lodato, G., et al. 2022, MNRAS, 512, L74

Tabone, B., van Dishoeck, E. F., & Black, J. H. 2024, A&A, 691, A11

Tabone, B., van Hemert, M. C., van Dishoeck, E. F., & Black, J. H. 2021, A&A, 650, A192

Taniguchi, K., Pineda, J. E., Caselli, P., et al. 2024, ApJ, 965, 162

Tanious, M., Le Gal, R., Faure, A., et al. 2025, A&A, 703, A244

Tanious, M., Le Gal, R., Neri, R., et al. 2024, A&A, 687, A92

Tazaki, R., Murakawa, K., Muto, T., Honda, M., & Inoue, A. K. 2021, ApJ, 921, 173

Tazzari, M., Testi, L., Ercolano, B., et al. 2016, A&A, 588, A53

Tazzari, M., Testi, L., Natta, A., et al. 2017, A&A, 606, A88

Teague, R. 2019a, The Journal of Open Source Software, 4, 1220

Teague, R. 2019b, The Journal of Open Source Software, 4, 1632

Teague, R. 2020, richteague/keplerian_mask: Initial Release

Teague, R., Bae, J., Aikawa, Y., et al. 2021, ApJS, 257, 18

Teague, R., Bae, J., Huang, J., & Bergin, E. A. 2019, ApJ, 884, L56

Teague, R. & Foreman-Mackey, D. 2018, Research Notes of the American Astronomical Society, 2, 173

Temmink, M., Booth, A. S., Leemker, M., et al. 2025a, A&A, 693, A101

Temmink, M., Booth, A. S., van der Marel, N., & van Dishoeck, E. F. 2023, A&A, 675, A131

Temmink, M., Sellek, A. D., Gasman, D., et al. 2025b, A&A, 699, A134

Temmink, M., van Dishoeck, E. F., Gasman, D., et al. 2024a, A&A, 689, A330

Temmink, M., van Dishoeck, E. F., Grant, S. L., et al. 2024b, A&A, 686, A117

Tennyson, J. 2019, Astronomical Spectroscopy. An Introduction to the Atomic and Molecular Physics of Astronomical Spectroscopy

Terwisscha van Scheltinga, J., Hogerheijde, M. R., Cleeves, L. I., et al. 2021, ApJ, 906, 111

Terwisscha van Scheltinga, J., Ligterink, N. F. W., Bosman, A. D., Hogerheijde, M. R., & Linnartz, H. 2022, A&A, 666, A35

Thi, W. F., Kamp, I., Woitke, P., et al. 2013, A&A, 551, A49

Thi, W. F., van Dishoeck, E. F., Blake, G. A., et al. 2001, ApJ, 561, 1074

Thi, W. F., van Zadelhoff, G. J., & van Dishoeck, E. F. 2004, A&A, 425, 955

Tielens, A. 2021, Molecular Astrophysics

Tielens, A. G. G. M. 2013, Reviews of Modern Physics, 85, 1021

Tielens, A. G. G. M. & Allamandola, L. J. 1987, in Interstellar Processes, ed. D. J. Hollenbach & J. Thronson, Harley A., Vol. 134, 397

Tielens, A. G. G. M. & Hagen, W. 1982, A&A, 114, 245

Tielens, A. G. G. M. & Hollenbach, D. 1985, ApJ, 291, 747

Tobin, J. J. & Sheehan, P. D. 2024, ARA&A, 62, 203

Tobin, J. J., van't Hoff, M. L. R., Leemker, M., et al. 2023, Nature, 615, 227

Trapman, L., Facchini, S., Hogerheijde, M. R., van Dishoeck, E. F., & Bruderer, S. 2019, A&A, 629, A79

Trapman, L., Miotello, A., Kama, M., van Dishoeck, E. F., & Bruderer, S. 2017, A&A, 605, A69

Trapman, L., Rosotti, G., Bosman, A. D., Hogerheijde, M. R., & van Dishoeck, E. F. 2020, A&A, 640, A5

Trapman, L., Tabone, B., Rosotti, G., & Zhang, K. 2022a, ApJ, 926, 61

Trapman, L., Zhang, K., van't Hoff, M. L. R., Hogerheijde, M. R., & Bergin, E. A. 2022b, ApJ, 926, L2

Tychoniec, Ł., Manara, C. F., Rosotti, G. P., et al. 2020, A&A, 640, A19

Tychoniec, Ł., van Gelder, M. L., van Dishoeck, E. F., et al. 2024, A&A, 687, A36

Urbina, F., Miley, J., Kama, M., & Keyte, L. 2024, A&A, 686, A120

Urpin, V. & Brandenburg, A. 1998, MNRAS, 294, 399

Valenti, J. A., Johns-Krull, C. M., & Linsky, J. L. 2000, ApJS, 129, 399

van Capelleveen, R. F., Ginski, C., Kenworthy, M. A., et al. 2025, ApJ, 990, L8

van der Marel, N. 2023, European Physical Journal Plus, 138, 225

van der Marel, N., Booth, A. S., Leemker, M., van Dishoeck, E. F., & Ohashi, S. 2021a, A&A, 651, L5

van der Marel, N., Bosman, A. D., Krijt, S., Mulders, G. D., & Bergner, J. B. 2021b, A&A, 653, L9

van der Marel, N., Cazzoletti, P., Pinilla, P., & Garufi, A. 2016a, ApJ, 832, 178

van der Marel, N. & Pinilla, P. 2023, arXiv e-prints, arXiv:2310.09077

van der Marel, N., van Dishoeck, E. F., Bruderer, S., et al. 2016b, A&A, 585, A58

van der Marel, N., van Dishoeck, E. F., Bruderer, S., et al. 2013, Science, 340, 1199

van der Marel, N., van Dishoeck, E. F., Bruderer, S., & van Kempen, T. A. 2014, A&A, 563, A113

van der Plas, G., Casassus, S., Ménard, F., et al. 2014, ApJ, 792, L25

van der Plas, G., van den Ancker, M. E., Waters, L. B. F. M., & Dominik, C. 2015, A&A, 574, A75

van der Tak, F. F. S., Black, J. H., Schöier, F. L., Jansen, D. J., & van Dishoeck, E. F. 2007, A&A, 468, 627

van Dishoeck, E. F. 2006, Proceedings of the National Academy of Science, 103, 12249

van Dishoeck, E. F. 2014, Faraday Discussions, 168, 9

van Dishoeck, E. F. & Black, J. H. 1988, ApJ, 334, 771

van Dishoeck, E. F., Herbst, E., & Neufeld, D. A. 2013, Chemical Reviews, 113, 9043

van Dishoeck, E. F., Kristensen, L. E., Mottram, J. C., et al. 2021, A&A, 648, A24

van Gelder, M. L., Ressler, M. E., van Dishoeck, E. F., et al. 2024, A&A, 682, A78

van Gelder, M. L., Tabone, B., van Dishoeck, E. F., & Godard, B. 2021, A&A, 653, A159

van 't Hoff, M. L. R., Tobin, J. J., Trapman, L., et al. 2018, ApJ, 864, L23

van 't Hoff, M. L. R., Walsh, C., Kama, M., Facchini, S., & van Dishoeck, E. F. 2017, A&A, 599, A101

van Terwisga, S. E., van Dishoeck, E. F., Ansdell, M., et al. 2018, A&A, 616, A88

van Zadelhoff, G. J., Aikawa, Y., Hogerheijde, M. R., & van Dishoeck, E. F. 2003, A&A, 397, 789

van Zadelhoff, G. J., van Dishoeck, E. F., Thi, W. F., & Blake, G. A. 2001, A&A, 377, 566

van't Hoff, M. L. R. & Bergner, J. B. 2026, in Encyclopedia of Astrophysics, Vol. 1, 210–232

Verhoeff, A. P., Min, M., Pantin, E., et al. 2011, A&A, 528, A91

Vidal, T. H. G., Loison, J.-C., Jaziri, A. Y., et al. 2017, MNRAS, 469, 435

Villenave, M., Ménard, F., Dent, W. R. F., et al. 2020, A&A, 642, A164

Vioque, M., Booth, R. A., Ragusa, E., et al. 2026, A&A, 705, A238

Virtanen, P., Gommers, R., Oliphant, T. E., et al. 2020, Nature Methods, 17, 261

Visser, R., van Dishoeck, E. F., Doty, S. D., & Dullemond, C. P. 2009, A&A, 495, 881

Vlasblom, M., Temmink, M., Grant, S. L., et al. 2025a, A&A, 693, A278

Vlasblom, M., Temmink, M., Sellek, A. D., & van Dishoeck, E. F. 2025b, A&A, 703, A52

Vlasblom, M., van Dishoeck, E. F., Tabone, B., & Bruderer, S. 2024, A&A, 682, A91

Waelkens, C., Waters, L. B. F. M., de Graauw, M. S., et al. 1996, A&A, 315, L245

Wafflard-Fernandez, G. & Baruteau, C. 2020, MNRAS, 493, 5892

Waggoner, A. R. & Cleeves, L. I. 2022, ApJ, 928, 46

Waggoner, A. R., Cleeves, L. I., Loomis, R. A., et al. 2023, ApJ, 956, 103

Wakelam, V., Bron, E., Cazaux, S., et al. 2017, Molecular Astrophysics, 9, 1

Wakelam, V., Herbst, E., Loison, J.-C., et al. 2012, ApJS, 199, 21

Walsh, C., Loomis, R. A., Öberg, K. I., et al. 2016, ApJ, 823, L10

Walsh, C., Millar, T. J., & Nomura, H. 2010, ApJ, 722, 1607

Walsh, C., Nomura, H., Millar, T. J., & Aikawa, Y. 2012, ApJ, 747, 114

Walsh, C., Nomura, H., & van Dishoeck, E. 2015, A&A, 582, A88

Watanabe, N. & Kouchi, A. 2002, ApJ, 571, L173

Watson, D. M., Leisenring, J. M., Furlan, E., et al. 2009, ApJS, 180, 84

Watson, W. D. 1976, Reviews of Modern Physics, 48, 513

Weaver, E., Isella, A., & Boehler, Y. 2018, ApJ, 853, 113

Wells, M., Pel, J. W., Glasse, A., et al. 2015, PASP, 127, 646

Werner, M. W., Roellig, T. L., Low, F. J., et al. 2004, ApJS, 154, 1

Wetherill, G. W. & Stewart, G. R. 1989, ICARUS, 77, 330

Wheeler, C. H., Hinkel, N. R., & Banzatti, A. 2024, PASP, 136, 113002

Wiesenfeld, L. & Faure, A. 2013, MNRAS, 432, 2573

Williams, J. P. & Cieza, L. A. 2011, ARA&A, 49, 67

Wilson, T. L. 1999, Reports on Progress in Physics, 62, 143

Woitke, P., Kamp, I., Antonellini, S., et al. 2019, PASP, 131, 064301

Woitke, P., Kamp, I., & Thi, W. F. 2009, A&A, 501, 383

Woitke, P., Min, M., Thi, W. F., et al. 2018, A&A, 618, A57

Woitke, P., Thi, W. F., Arabhavi, A. M., et al. 2024, A&A, 683, A219

Wölfer, L., Facchini, S., Kurtovic, N. T., et al. 2021, A&A, 648, A19

Wölfer, L., Facchini, S., van der Marel, N., et al. 2023, A&A, 670, A154

Wootten, A. & Thompson, A. R. 2009, IEEE Proceedings, 97, 1463

Wright, E. L., Eisenhardt, P. R. M., Mainzer, A. K., et al. 2010, AJ, 140, 1868

Wright, G. S., Rieke, G. H., Glasse, A., et al. 2023, PASP, 135, 048003

Wright, G. S., Wright, D., Goodson, G. B., et al. 2015, PASP, 127, 595

Wyatt, M. C. 2018, in Handbook of Exoplanets, ed. H. J. Deeg & J. A. Belmonte, 146

Xie, T., Allen, M., & Langer, W. D. 1995, ApJ, 440, 674

Yamato, Y., Aikawa, Y., Guzmán, V. V., et al. 2024a, ApJ, 974, 83

Yamato, Y., Notsu, S., Aikawa, Y., et al. 2024b, AJ, 167, 66

Yang, H., Fernández-López, M., Li, Z.-Y., et al. 2023, ApJ, 948, L2

Yang, H., Fernández-López, M., Li, Z.-Y., et al. 2024, ApJ, 963, 134

Yen, H.-W., Koch, P. M., Liu, H. B., et al. 2016, ApJ, 832, 204

Youdin, A. N. & Goodman, J. 2005, ApJ, 620, 459

Youdin, A. N. & Lithwick, Y. 2007, ICARUS, 192, 588

Young, A. K., Alexander, R., Walsh, C., et al. 2021, MNRAS, 505, 4821

Yu, S.-Y., Ho, L. C., & Zhu, Z. 2019, ApJ, 877, 100

Zagaria, F., Jiang, H., Cataldi, G., et al. 2025, ApJ, 989, 30

Zannese, M., Tabone, B., Habart, E., et al. 2024, Nature Astronomy [arXiv:2312.14056]

Zhang, K., Bergin, E. A., Blake, G. A., et al. 2016, ApJ, 818, L16

Zhang, K., Booth, A. S., Law, C. J., et al. 2021, ApJS, 257, 5

Zhang, K., Pontoppidan, K. M., Salyk, C., & Blake, G. A. 2013, ApJ, 766, 82

Zhang, S., Kalscheur, M., Long, F., et al. 2023, ApJ, 952, 108

Zhang, S., Zhu, Z., & Fairbairn, C. W. 2025, ApJ, 995, L33

Zhu, Z., Dong, R., Stone, J. M., & Rafikov, R. R. 2015, ApJ, 813, 88

Zhu, Z. & Stone, J. M. 2018, ApJ, 857, 34