NLSI Team Publications from April 2009 through November 2010

Abramov, O. and S.J. Mojzsis. 2009. "Microbial habitability of the Hadean Earth during the late heavy bombardment. Nature. 459:419-422

Abramov, O. and S.J. Mojzsis. 2010. "Abodes for life in carbonaceous asteroids." *Icarus*, in press.

Andrews-Hanna, J.C., and M.T. Zuber (2010), Elliptical craters and basins on the terrestrial planets, *Geol. Soc. Am. Spec. Pub., Large Meteorite Impacts and Planetary Evolution,* in press.

Barr, A.C. and R. Citron. 2010. "Melt Production in Hypervelocity Impacts." *Icarus*, In Press.

Basilevsky A.T., G. Neukum, and L. Nyquist (2010), The spatial and temporal distribution of lunar mare basalts as deduced from analysis of data for lunar meteorites, *Planet. Space Sci.,* doi:10.1016/j.pss.2010.08.020.

Bernardi, G., de Bruyn, A.G., & G. Harker, G., et al. 2010, "Foregrounds for observations of the cosmological 21 cm line: II. Westerbork observations of the fields around 3C196 and the North Celestial Pole," Astron. & Astrophys., in press; arXiv:1002.4177

Bowman, J. D. & Rogers, A. E. E., 2010, "Lower Limit of dz > 0.06 for the duration of the reionization epoch," Nature, in press

Bowman, J. D. & Rogers, A. E. E., 2010, "VHF-band RFI in Geographically Remote Areas," Proc. Science, in press

Boyce, J. W., Y. Liu, G. R. Rossman, Y. Guan, J. M. Eiler, E. M. Stolper, and L. A. Taylor (2010), Lunar apatite with terrestrial volatile abundances, *Nature, 466*, 466-469.

Brandon, A.D., T. J. Lapen, V. Debaille, B. L. Beard, K. Rankenburg, and C. Neal (2009) Re-evaluating the $^{142}Nd/^{144}Nd$ in lunar mare basalts with implications for the early evolution and bulk Sm/Nd of the Moon. *Geochimica et Cosmochimica Acta* 73, 6425–6445.

Bussey et al. (2010) Illumination conditions of the south pole of the Moon derived using Kaguya topography, Icarus, 10.1016/j.icarus.2010.03.028.

Colaprete, A., et al. (2010), Detection of water in the LCROSS ejection plume, Science, 330, 463.

Cole, D.M., L. A. Taylor, Y. Liu, Y., and M. A. Hopkins, (2010), Grain-scale mechanical properties of lunar plagioclase and its simulant: Initial experimental findings and

modeling implications, Earth Space Sci. 2010, *Engr., Sci., Constr., & Oper., ASCE*, 76-83.

Cooper, B.L., D. S. McKay, L. A. Taylor, H. Kawamoto, L. M. Riofrio, and C. P. Gonzalez (2010), Extracting respirable particles from lunar regolith for toxicology studies. Earth Space Sci. 2010: *Engr., Sci., Constr., & Oper., ASCE*, 66-73.

Crociani, D., Mesinger, A., Moscardini, L., & Furlanetto, S.R. 2010, "The distribution of Lyman-limit absorption systems during and after reionization," Mon. Not. R. Astron. Soc., in press; arXiv.org/1008.0003

Curran, S. J., Tzanavaris, P., Darling, J. K., Whiting, M. T., Webb, J. K., Bignell, C., Athreya, R., & Murphy, M. T. 2009, "New Searches for H i 21 cm in Damped Lyman α Absorption Systems," Mon. Not. R. Astron. Soc., in press

Currie, D. A lunar laser ranging retroreflector array for the 21st century, in press for special ISOT IEEE Conference Proceedings

Currie, D. G., Dell'Agnello. S. Delle Monache, G. A Lunar Laser Ranging Retroreflector Array for the 21st Century? Acta Astronautica (23 September 2010)

Datta, A., Bhatnagar, S., & Carilli, C. L. 2009, "Detection of Signals from Cosmic Reionization Using Radio Interferometric Signal Processing," ApJ, 703, 1851

Datta, A., Bowman, J. D., & Carilli, C. L. 2010, "Bright Source Subtraction Requirements For Redshifted 21 cm Measurements," Astrophys. J., 724, 526

de Oliveira-Costa, A., & Lazio, J. 2010, "Clustering of Extragalactic Sources from 151 MHz to 232 MHz: Implications for Cosmological 21-cm Observations," Mon. Not. R. Astron. Soc., in press; arXiv:1004.3167

Dell'Agnello, S.; Lops, C. Delle Monache, G. Currie, D. G. Martini, M. Vittori, R. Coradini, A, Dionisio, C. Garattini, M. Boni, A. Cantone, C. March, R. Bellettini, G. Tauraso , R. Maiello, M Porcelli, L. Berardi, S. Intaglietta, N. "Fundamental Physics and Absolute Positioning Metrology with the MAGIA Lunar Orbiter"; "Experimental Astronomy" and Experimental Astronomy, Online First (ExA Homepage) 08/2010

Dyar, M. D., C. A. Hibbitts, and T. M. Orlando (2010a), Mechanisms for incorporation of hydrogen in and on terrestrial planetary surfaces, *Icarus, 208,* 425-437, doi: 10.1016/j.icarus.2010.02.014.

Dyar, M. D., E. C. Sklute, O. N. Menzies, P. A. Bland, D. Lindsley, T. D. Glotch, M. D. Lane, M. W. Schaffer, B. Wopenka, R. L. Klima, J. L. Bishop, T. Hiroi, C. M. Pieters, and J. Sunshine (2009), Spectroscopic characteristics of synthetic olivine: An integrated multi-wavelength and multi-technique approach, *American Mineralogist*, *94*, 883-898.

Farrell, W. M. , T. J. Stubbs, J. S. Halekas, R. M. Killen, G. T. Delory, M. R. Collier, R. R. Vondrak (2010), The anticipated electrical environment within permanently shadowed lunar crater, *J. Geophys. Res.,* 115, E03004, doi:10.1029/2009JE003464.

Furlanetto, S. R., & Johnson Stoever, S. 2010, "Secondary Ionization and Heating by Fast Electrons," MNRAS, in press; arXiv.org:0910.4410

Garrick-Bethell, I., and B.P. Weiss (2010), Kamacite blocking temperatures and applications to lunar magnetism, *Earth Planet. Sci. Lett.,* 294, 1-7.

Garrick-Bethell, I., and M.T. Zuber (2009), Elliptical structure of the lunar South Pole-Aitken basin, *Icarus, 204,* 399-408.

Garrick-Bethell, I., F. Nimmo, and M.A. Wieczorek (2010), Structure and formation of the lunar farside highlands, in press.

Gaskin, J., T. Abbott, S. Medley, K. Patty, D. Gregory, K. Thaisen, B. Ramsey, G. Jerman, A. Sampson, R. Harvey, and L. A. Taylor (2010), Miniturized scanning electron microprobe for in-situ planetary studies. *Earth & Space Sci. 2010: Engr., Sci., Constr., & Oper., ASCE*, 1246-1257.

Gibson, E.K., C. T. Pillinger, and L. J. Waugh (2010) Lunar Beagle and Lunar Astrobiology. *Earth, Moon, and Planets* 107.

Glotch, T.D., P. G. Lucey, J. L. Bandfield, B. T. Greenhagen, I. R. Thomas, R. C. Elphic, N. Bowles, M. B. Wyatt, C. C. Allen, K. D. Hanna, and D. A. Paige (2010) Highly silicic compositions on the Moon. *Science 329*, 1510–1513.

Greenhagen, B.T., P. G. Lucey, M. B. Wyatt, T. D. Glotch, C. C. Allen, J. A. Arnold, J. L. Bandfield, N. E. Bowles, K. L. Donaldson Hanna, P. O. Hayne, E. Song, I. R. Thomas, and D. A. Paige (2010) Global silicate mineralogy of the Moon from the Diviner Lunar Radiometer. *Science 329*, 1507–1509.

Grove, T.L., and M. J. Krawczynski (2009), Lunar mare volcanism: Where did the magmas come from? *Elements, 5*, 29-34.

Harker G. J. A., Zaroubi S., Bernardi G., Brentjens M. A., de Bruyn A. G., Ciardi B., Jelić V., Koopmans L. V. E., Labropoulos P., Mellema G., Offringa A., Pandey V. N., Pawlik A. H., Schaye J., Thomas R. M., & Yatawatta S. 2010, "Power Spectrum Extraction for Redshifted 21-cm Epoch of Reionization Experiments: The LOFAR Case", Mon. Not. R. Astron. Soc., 405, 2492

Haruyama, J., K. Hioki, M. Shirao, T. Morota, H. Hiesinger, C van der Bogert, H. Miyamoto, A. Iwasaki, Y. Yokota, M. Ohtake, T. Matsunaga, S. Hara, S. Nakanotani, and C. M. Pieters

(2009), Possible lunar lava tube skylight observed by SELENE cameras, *Geophys. Res. Lett., 36*, L21206, doi:10.1029/2009GL040635.

Head, J. W. (2010), Transition from complex craters to multi-ringed basins on terrestrial planetary bodies: Scale-dependent role of the expanding melt cavity and progressive interaction with the displaced zone, *Geophys. Res. Lett., 37,* L02203, doi: 1029/2009GL041790.

Henning, P., Ellingson, S.W., Taylor, G.B., Craig, J., Philstrom, Y., Rickard, L.J., Clarke, T., Kassim, N.E., & Cohen, A. 2010, "The First Station of the Long Wavelength Array," Proc. Sci., in press; astro-ph/1009.0666

Hiesinger, H., J. W. Head III, U. Wolf, R. Jaumann, and G. Neukum (2010), Ages and stratigraphy of lunar mare basalts in Mare Frigoris and other nearside maria based on crater size-frequency distribution measurements, *J. Geophys. Res., 115,* E03003, doi:10.1029/2009JE003380.

Horanyi, M., O. Havnes, G. E. Mor_ll, Complex Plasmas in the Solar System, in: Complex (Dusty) Plasmas, eds: V. Fortov and G.E. Mor_ll, CRC Press: Series in Plasma Physics, 2009.

Hyman, S. D., Wijnands, R., Lazio, T. J. W., Pal, S. Starling, R., Kassim, N. E., & Ray, P. S. 2009, "GCRT J1742−3001: A New Radio Transient Toward the Galactic Center," ApJ, 696, 280

Isaacson, P. J., A. Basu Sarbadhikari, C. M. Pieters, R. L. Klima, T. Hiroi, Y. Liu, and L. A. Taylor (2010), The Lunar Rock and Mineral Characterization Consortium: Deconstruction and Integrated Analyses of Mare Basalts, *Meteorit. Planet. Sci.*, in press.

Isaacson, P. J., and C. M. Pieters (2009), Northern Imbrium Noritic anomaly, *J. Geophys. Res., 114,* E09007, doi:10.1029/2008JE003293.

Isaacson, P.J., Pieters, C.M. (2010), Deconvolution of lunar olivine reflectance spectra: Implications for remote compositional assessment. Icarus doi:10.1016/j.icarus.2010.06.004

Jones, D. L. 2009, "A Lunar Array Precursor Station to Monitor the Lunar Ionosphere," IEEE Aerospace Conf. 2009 (Big Sky, MO), paper 6.0202

Joy, K.H., I. A. Crawford, S. S. Russell, and A. T. Kearsley (2010) Lunar meteorite regolith breccias: An in situ study of impact melt composition using LA-ICP-MS with implications for the composition of the lunar crust. *Meteoritics and Planetary Science 45*, 917–946.

Killen, R.M., A.E.Potter, D.M. Hurley, C. Plymate, S. Naidu, (2010). Observations of the

LCROSS Event from the McMath_Pierce Solar Telescope: Sodium and Dust. *NOAO/NSO Newsletter*, 101,8

Killen, R.M., et al., , (2010), Observations of the impact plume from the LCROSS event, *Geophys. Res. Lett,* in press .

Lawrence D.J., RC. Elphic, WC. Feldman, HO. Funsten, and TH. Prettyman (2010) Performance of Orbital Neutron Instruments for Spatially-Resolved Hydrogen Measurements of Airless Planetary Bodies, Astrobiology, 10(#2), 183 – 200, 10.1089/ast.2009.0401.

Lawrence, D.J., D. M. Hurley, W. C. Feldman, R. C. Elphic, S. Maurice, R. S. Miller, and T. H. Prettyman (2010) Sensitivity Of Orbital Neutron Measurements To The Thickness And Abundance Of Surficial Lunar Water, Journal of Geophysical Research, 10.1029/2010JE003678, in press.

Lazio, T. J. W., Carmichael, S., Clark, J., Elkins, E., Gudmundsen, P., Mott, Z., Szwajkowski, M., & Hennig, L. A. 2010, "A Blind Search for Magnetospheric Emissions from Planetary Companions to Nearby Solar-Type Stars," AJ, 139, 96

Lazio, T. J. W., Clarke, T. E., Lane, W. M., et al. 2010, "Title: Surveying the Dynamic Radio Sky with the Long Wavelength Demonstrator Array," Astron. J., in press; arXiv:1010.5893

Lazio, T. J. W., Shankland, P. D., Farrell, W. M., & Blank, D. L. 2010, "Radio Observations of HD 80606 Near Planetary Periastron," Astron. J., in press; arXiv:1010.5383

Levison, H.F., W.F. Bottke, M. Gounelle, A. Morbindelli, D. Nesvorny, K. Tsiganis. 2009. Nature. 460:364-366

Liu,Y., M. J. Spicuzza, P. R. Craddock, J. M. D. Day, J. W. Valley, D. Dauphas, and L. A. Taylor (2010), Coupled oxygen and iron isotope analyses of lunar mare basalts: Near-surface fractionation and source characteristics. *Geochim. Cosmochim. Acta*, in press.

Loeb, A. 2010, How Did the First Stars and Galaxies Form? (Princeton: Princeton University Press) Frontiers in Physics Series

Marshall, J. R. , D. Richard, S. Davis, Electrical stress and strain in lunar regolith, Planet. Space Sci., in press.

Martin, W.E., Hesse, E., Hough, J.H., Sparks, W.B., Cockell, C.S., Ulanowski, Z., Germer, T.A., Kaye, P.H., 2010, JQSRT, accepted "Polarized Optical Scattering Signatures from Biological Materials"

Merkowitz, S. M. "Tests of Gravity Using Lunar Laser Ranging", Living Rev. Relativity 13, (2010), 7.

Mesinger, A., Furlanetto, S.R., & Cen, R. 2010, "21cmFAST: A Fast, Semi-Numerical Simulation of the High-Redshift 21-cm Signal," Mon. Not. R. Astron. Soc., in press; arXiv.org/1003.3878

Meyer, J., Elkins-Tanton, L.T., and Wisdom, J. (2010), Coupled thermal-orbital evolution of the early Moon, *Icarus*, 208, 1-10, doi:10.1016/j.icarus.2010.01.029.

Miller, J., L. Taylor, C. Zeitlin, L. Heilbronn, S. Guetersloh, M. DiGiuseppe, Y. Iwata, and T. Murakami (2009), Lunar soil as shielding against space radiation, *Radiation Measurements, 44*, 163-167, doi:10.1016/j.radmeas.2009.01.010.

Mojzsis, S.J. 2010. "Leftover lithosphere." Nature Geoscience. 3:148-149

Munoz, J. A., Trac, H., & Loeb, A. 2009, "Galaxy Statistics in Pencil-beam Surveys at High Redshifts", MNRAS 405, 2001

Murphy, T. W. Jr., Adelberger, E. G., Battat, J. B. R.,Hoyle, C. D., McMillan, R. J., Michelsen, E. L., Samad, R. L., Stubbs, C. W., and Swanson, H. E., ``Long-term degradation of optical devices on the Moon, Icarus V. 208, 31-35, (2010)

Nemchin, A.A., M. L. Grange, and R. T. Pidgeon (2010) Distribution of rare earth elements in lunar zircon. *American Mineralogist* 95, 273–283.

Nemchin, A.A., R. T. Pidgeon, D. Healy, M. L. Grange, M. J. Whitehouse, and J. Vaughn (2009) The comparative behavior of apatite-zircon U-Pb systems in Apollo 14 breccias: Implications for the thermal history of the Fra Mauro Formation. *Meteoritics and Planetary Science* 11, 1717–1734.

Nesvorny, D., P. Jenniskens, H.F. Levison, W.F. Bottke, D. Vokrouhlicky, and M. Gounelle. 2010. Cometary origin of the zodiacal cloud and carbonaceous micrometeorites. Implications for hot debris disks. The Astrophysical Journal. 713:816-836.

Nicholis, M. G., and M. J. Rutherford (2009), Graphite oxidation in the Apollo 17 orange glass magma: Implications for the generation of a lunar volcanic gas phase, *Geochim. Cosmochim. Acta,* 73, 5905-5917.

Norman, M.D., R. A. Duncan, and J. J. Huard (2010) Imbrium provenance for the Apollo 16 Descartes terrain: Argon ages and geochemistry of lunar breccias 67016 and 67455. *Geochimica et Cosmochimica Acta 74*, 763–783.

Ohtake, M., T. Matusanaga, J. Haruyama, Y. Yokota, T. Morota, C. Honda, Y. Ogawa, M. Torii, H. Miyamoto, T. Arai, N. Hirata, A. Iwasaki, R. Nakamura, T. Hiroi, T. Sugihara, H. Takeda, H. Otake, C. Pieters, K. Saiki, K. Kitazato, M. Abe, N. Asada, H. Demura, Y. Yamaguchi, S. Sasaki, S. Kodama, J. Terazono, M. Shirao, A. Yamaji, S. Minami, H.

Akiyama, and J-L Josset (2009) The global distribution of pure anorthosite on the Moon, *Nature, 461*, 236-240, | doi:10.1038/nature08317.

Peron, R.; Bellettini, G.; Berardi, S.; Boni, A.; Cantone, C.; Coradini, A.; Currie, D. G.; Dell'Agnello, S.; Delle Monache, G. O.; Fiorenza, E.; Garattini, M.; Iafolla, V.; Intaglietta, N.; Lefevre, C.; Lops, C.; March, R.; Martini, M.; Nozzoli, S.; Patrizi, G.; Porcelli, L.; Reale, A.; Santoli, F.; Tauraso, R.; Vittori, R. "Advanced instrumentation for Solar System gravitational physics" EGU General Assembly 2010, held 2-7 May, 2010 in Vienna, Austria, p.11869 May 2010

Peters, W. M., Lazio, T. J. W., Clarke, T. E., Erickson, W. C., & Kassim, N. E. 2010, "Radio Recombination Lines at Decametre Wavelengths: Prospects for the Future," Astron. & Astrophys., in press; arXiv:1010.0292

Pidgeon, R.T., A. A. Nemchin, and C. Meyer (2010) The contribution of the sensitive high-resolution ion microprobe (SHRIMP) to lunar geochronology. *Precambrian Research 183*, 44–49.

Pieters, C. M., J. N. Goswami, R. N. Clark, M. Annadurai, J. Boardman, B. Buratti, J.-P. Combe, M. D. Dyar, R. Green, J. W. Head, C. Hibbitts, M. Hicks, P. Isaacson, R. Klima, G. Kramer, S. Kumar, E. Livo, S. Lundeen, E. T. Malaret, T. McCord, J. Mustard, J. Nettles, N. Petro, C. Runyon, M. Staid, J. Sunshine, L. A. Taylor, S. Tompkins, and P. Varanasi (2009), Character and spatial distribution of OH/H2O on the surface of the Moon seen by M3 on Chandrayaan-1, *Science, 326*, 568-572.

Poppe, A., M. Horanyi, Simulations of the Photoelectron Sheath and Dust Levitation on the Lunar Surface, J. Gephys. Res. 115, A08106, doi:10.1029/2010JA015286, 2010

Pritchard, J. R., Loeb, A., & Wyithe, J. S. B. 2009, "Constraining Reionization Using 21-cm Observations in Combination with CMB and Lyman-alpha Forest Data," Mon. Not. R. Astron. Soc., 408, 57

Pritchard, J., & Loeb, A. 2010, "Constraining the Unexplored Period Between Reionization and the Dark Ages with Observations of the Global 21-cm Signal," Phys. Rev. D82, 023006; arXiv:1005.4057

Roberson, I. P., S. Sembay, T. J. Stubbs, K. D. Kuntz, M. R. Collier, T. E. Cravens, S. L. Snowden, H. K. Hills, F. S. Porter, P. Travnicek, J. A. Carter, and A. M. Read, (2009), Solar wind charge exchange observed through the lunar exosphere, *Geophys. Res.Lett., 36,* L21102, doi:10.1029/2009GL040834.

Rochette, P., B. P. Weiss, and J. Gattacceca (2009), Magnetic minerals and magnetism of extraterrestrial materials, *Elements*, 5, 223-228.

Roy, S., Hyman, S. D., Pal, S., Lazio, T. J. W., Ray, P. S., & Kassim, N. E. 2010, "Circularly polarized emission from the transient bursting radio source GCRT J1745−3009," ApJ, in press

Rutherford, M. J., and P. Papale (2009), Origin of basalt fire-fountain eruptions on Earth versus the Moon, *Geology,* 37, 219-222.

Sarantos, M., R. M. Killen, A. S. Sharma and J. A. Slavin (2010), Sources of sodium in the lunar exosphere: Modeling using ground-based observations of sodium emission and spacecraft data of the plasma, *Icarus* 205, p. 364-374.

Schultz, P. H., and D. A. Crawford (2010), Origin of nearside structural and geochemical anomalies on the Moon, *Geological Society of America Special Paper*, in press.

Shkuratov, Yu., V. Kaydash, S. Gerasimenko, N. Opanasenko, Yu. Velikodsky, V. Korokhin, G. Videen, and C. Pieters (2010), Probable swirls detected as photometric anomalies in Oceanus Procellarum, Icarus, doi:10.1016/j.icarus.2010.01.028, in press.

Shuster, D.L., G. Balco, W.S. Cassata, V.A. Fernandes, I. Garrick-Bethell, and B.P. Weiss (2010), A record of impacts preserved in the lunar regolith, *Earth Plane. Sci. Lett., 290*, 155-165 (2010).

Stubbs, T. J., D. A. Glenar, A. Colaprete, and D. T. Richard (2010), Optical scattering processes observed at the Moon: Predictions for the LADEE Ultraviolet Spectrometer, *Planet. Space Sci.*, 58, 830, doi:10.1016/j.pss.2010.01.002.

Taylor, L. A., C. M. Pieters, A. Patchen, D.-H. S. Taylor, R. V. Morris, L. P. Keller, and D. S. McKay (2010), Mineralogical and chemical characterization of lunar highland soils: Insights into the space weathering of soils on airless bodies, *J. Geophys. Res., 115*, E02002, 14 PP., doi:10.1029/2009JE003427.

Taylor, L.A., and L. Liu (2010), Important considerations for lunar soil simulants, *Earth & Space Sci. 2010: Engr., Sci., Constr., & Oper., ASCE,* 106-118.

Thacker, C., Liang, Y., Peng, Q. L. & Hess, P. (2009). The stability and major element partitioning of ilmenite and armalcolite during lunar cumulate mantle overturn. *Geochimica Et Cosmochimica Acta,* 73, 820-836.

Thaisen, K.G., J. A. Gaskin, B. D. Ramsey, G. Jerman, A. R. Sampson, and L. A. Taylor (2010), Development of a miniature scanning electron microscope to facilitate in-situ lunar science and engineering, *Earth & Space Sci. 2010: Engr., Sci., Constr., & Oper., ASCE*, 1046-1053.

Visbal, E., Loeb, A., & Wyithe, S. 2009, "Cosmological Constraints from 21-cm Surveys after Reionization," Journal of Cosmology and Astro-Particle Physics, 10, 30

Wang, X., M. Horanyi, S. Robertson, Experiments on dust transport in plasma to investigate the origin of the lunar horizon glow, J. Geophys. Res., 114, Issue A5, CiteID A05103, 2009.

Wang, X., M. Horanyi, S. Robertson, Investigation of dust transport on the lunar surface in a laboratory plasma with an electron beam, J. Geophys. Res.115, A11102, doi: 10.1029/2010JA015465, 2010

Weider, S.Z., I. A. Crawford, and K. H. Joy (2010) Individual lava flow thicknesses in Oceanus Procellarum and Mare Serenitatis determined from Clementine multispectral data. *Icarus 209*, 323–336.

Wyithe, J. S. B., & Loeb, A. 2009, "The 21-cm Power Spectrum After Reionization," MNRAS, 397, 1926

Yamaguchi, A., Y. Karouji, H. Takeda, L. Nyquist, D. Bogard, M. Ebihara, C.-Y. Shih, Y. Reese, D. Garrison, J. Park, G. McKay (2010) The variety of lithologies in the Yamato-86032 lunar meteorite: Implications for formation processes of the lunar crust. *Geochimica et Cosmochimica Acta 74*, 4507–4530.

Zeiger, B., & Darling, J. 2010, "Formaldehyde Anti-Inversion at z = 0.68 in the Gravitational Lens B0218+357," ApJ, 709, 386

Zhang, A., Y. Guan, W. Hsu, Y. Liu, and L. A. Taylor (2010), Origin of a recrystallized lithic clast in CM chondrite Grove Mountain 021536, *Meteoritics & Planetary Science, 45,* 238-245.