

Publications

151. M. D. Hannel, A. Abdulali, M. O'Brien, D. G. Grier, "Machine-learning techniques for fast and accurate feature localization in holograms of colloidal particles," *Opt. Express* **26**, 15221–15231 (2018).
150. A. Mondal, Yevick, Aaron, L. C. Blackburn, N. Kanellakopoulos, D. G. Grier, "Projecting non-diffracting waves with intermediate-plane holography," *Opt. Express* **26**, 3926–3931 (2018).
149. A. Mondal, Y. Xu, L. A. Wray, D. G. Grier, "Classically accelerating solenoidal wave packets in two dimensions," *Phys. Rev. Lett.* submitted for publication (2018).
148. F. C. Cheong, P. Kasimbeg, D. B. Ruffner, E. H. Hlaing, J. M. Blusewicz, L. A. Philips, D. G. Grier, "Holographic characterization of colloidal particles in turbid media," *Appl. Phys. Lett.* **111**, 153702 (2017).
147. P. G. Moerman, H. W. Moyses, E. B. van der Wee, D. G. Grier, A. van Blaaderen, W. K. Kegel, J. Groenewold, J. Brujic, "Solute-mediated interactions between active droplets," *Phys. Rev. E* **96**, 032607 (2017).
146. L. A. Philips, D. B. Ruffner, F. C. Cheong, J. M. Blusewicz, P. Kasimbeg, B. Waisi, J. McCutcheon, D. G. Grier, "Holographic characterization of contaminants in water: Differentiation of suspended particles in heterogeneous dispersions," *Water Research* **122**, 431–439 (2017).
145. A. Yevick, D. J. Evans, D. G. Grier, "Photokinetic analysis of the forces and torques exerted by optical tweezers carrying angular momentum," *Phil. Trans. Roy. Soc. A* **375**, 20150432 (2017).
144. D. J. Evans, A. D. Hollingsworth, D. G. Grier, "Charge renormalization in nominally apolar colloidal dispersions," *Phys. Rev. E* **93**, 042612 (2016).
143. H. Moyses, J. Palacci, S. Sacanna, D. G. Grier, "Trochoidal trajectories of self-propelled Janus particles in a diverging laser beam," *Soft Matter* **16**, 6357–6364 (2016).
142. C. Wang, X. Zhong, D. B. Ruffner, A. Stutt, L. A. Philips, M. D. Ward, D. G. Grier, "Holographic characterization of protein aggregates," *J. Pharm. Sci.* **105**, 1074–1085 (2016).
141. C. Wang, F. C. Cheong, D. B. Ruffner, X. Zhong, M. D. Ward, D. G. Grier, "Holographic characterization of colloidal fractal aggregates," *Soft Matter* **12**, 8774–8780 (2016).
140. A. Yevick, D. B. Ruffner, D. G. Grier, "Tractor beams in the Rayleigh limit," *Phys. Rev. A* **93**, 043807 (2016).
139. M. Hannel, C. Middleton, D. G. Grier, "Holographic characterization of imperfect colloidal spheres," *Appl. Phys. Lett.* **107**, 141905 (2015).
138. C. P. Kelleher, A. Wang, G. I. Guerrero-García, A. D. Hollingsworth, R. E. Guerra, B. J. Krishnatreya, D. G. Grier, V. N. Manoharan, P. M. Chaikin, "Charged hydrophobic colloids at an oil-aqueous phase interface," *Phys. Rev. E* **92**, 062306 (2015).
137. H. Moyses, R. O. Bauer, A. Y. Grosberg, D. G. Grier, "Perturbative theory for Brownian vortexes," *Phys. Rev. E* **91**, 062144 (2015).
136. C. Wang, H. Shpaisman, A. D. Hollingsworth, D. G. Grier, "Celebrating *Soft Matter*'s 10th Anniversary: Monitoring colloidal growth with holographic microscopy," *Soft Matter* **11**, 1062–1066 (2015).
135. C. Wang, H. W. Moyses, D. G. Grier, "Stimulus-responsive colloidal sensors with fast holographic readout," *Appl. Phys. Lett.* **107**, 051903 (2015).

134. B. J. Krishnatreya, A. Colen-Landy, P. Hasebe, B. A. Bell, J. R. Jones, A. Sunda-Meya, D. G. Grier, “Measuring Boltzmann’s constant through holographic video microscopy of a single sphere,” *Am. J. Phys.* **82**, 23–31 (2014).
133. B. J. Krishnatreya, D. G. Grier, “Fast feature identification for holographic tracking: The orientation alignment transform,” *Opt. Express* **22**, 12773–12778 (2014).
132. C. L. Phillips, E. Jankowski, B. J. Krishnatreya, K. V. Edmond, S. Sacanna, D. G. Grier, D. J. Pine, S. C. Glotzer, “Digital colloids: Reconfigurable clusters as high information density elements,” *Soft Matter* **10**, 7468–7479 (2014).
131. D. B. Ruffner, D. G. Grier, “Universal, strong and long-ranged trapping by optical conveyors,” *Opt. Express* **22**, 26834–26853 (2014).
130. A. Yevick, M. Hannel, D. G. Grier, “Machine-learning approach to holographic particle characterization,” *Opt. Express* **22**, 26884–26890 (2014).
129. W. T. M. Irvine, A. D. Hollingsworth, D. G. Grier, P. M. Chaikin, “Dislocation reactions, grain boundaries and irreversibility in two dimensional lattices using topological tweezers,” *Proc. Natl. Acad. Sci. U.S.A.* **110**, 15544–15548 (2013).
128. H. Moyses, B. J. Krishnatreya, D. G. Grier, “Robustness of holographic video microscopy against defects in illumination,” *Opt. Express* **21**, 5968–5973 (2013).
127. D. B. Ruffner, D. G. Grier, “Comment on ‘Scattering Forces from the Curl of the Spin Angular Momentum of a Light Field’,” *Phys. Rev. Lett.* **111**, 059301 (2013).
126. H. Shpaisman, D. B. Ruffner, D. G. Grier, “Light-driven three-dimensional rotational motion of dandelion-shaped microparticles,” *Appl. Phys. Lett.* **102**, 071103 (2013).
125. Y. Han, D. G. Grier, “Colloidal electroconvection in a thin horizontal cell: III. Interfacial and transient patterns on electrodes,” *J. Chem. Phys.* **137**, 014504 (2012).
124. D. B. Ruffner, D. G. Grier, “Optical forces and torques in non-uniform beams of light,” *Phys. Rev. Lett.* **108**, 173602 (2012).
123. D. B. Ruffner, D. G. Grier, “Optical conveyors: A class of active tractor beams,” *Phys. Rev. Lett.* **109**, 163903 (2012).
122. H. Shpaisman, B. J. Krishnatreya, D. G. Grier, “Holographic microrefractometer,” *Appl. Phys. Lett.* **101**, 091102 (2012).
121. F. C. Cheong, K. Xiao, D. J. Pine, D. G. Grier, “Holographic characterization of individual colloidal spheres’ porosities,” *Soft Matter* **7**, 6816–6819 (2011).
120. L. Dixon, F. C. Cheong, D. G. Grier, “Holographic particle-streak velocimetry,” *Opt. Express* **19**, 4393–4398 (2011).
119. L. Dixon, F. C. Cheong, D. G. Grier, “Holographic deconvolution microscopy for high-resolution particle tracking,” *Opt. Express* **19**, 16410–16417 (2011).
118. E. R. Shanblatt, D. G. Grier, “Extended and knotted optical traps in three dimensions,” *Opt. Express* **19**, 5833–5838 (2011).
117. Y. Sokolov, D. Frydel, D. G. Grier, H. Diamant, Y. Roichman, “Hydrodynamic pair attractions between driven colloidal particles,” *Phys. Rev. Lett.* **107**, 158302 (2011).
116. K. Xiao, Y. Roichman, D. G. Grier, “Two-dimensional optical thermal ratchets based on Fibonacci spirals,” *Phys. Rev. E* **84**, 011131 (2011).

115. F. C. Cheong, D. G. Grier, “Rotational and translational diffusion of copper oxide nanorods measured with holographic video microscopy,” *Opt. Express* **18**, 6555–6562 (2010).
114. F. C. Cheong, B. J. Krishnatreya, D. G. Grier, “Strategies for three-dimensional particle tracking with holographic video microscopy,” *Opt. Express* **18**, 13563–13573 (2010).
113. S.-H. Lee, Y. Roichman, D. G. Grier, “Optical solenoid beams,” *Opt. Express* **18**, 6988–6993 (2010).
112. B. Sun, D. G. Grier, A. Y. Grosberg, “Minimal model for Brownian vortexes,” *Phys. Rev. E* **82**, 021123 (2010).
111. K. Xiao, D. G. Grier, “Multidimensional optical fractionation with holographic verification,” *Phys. Rev. Lett.* **104**, 028302 (2010).
110. K. Xiao, D. G. Grier, “Sorting colloidal particles into multiple channels with optical forces: Prismatic optical fractionation,” *Phys. Rev. E* **82**, 051407 (2010).
109. F. C. Cheong, B. Sun, R. Dreyfus, J. Amato-Grill, K. Xiao, L. Dixon, D. G. Grier, “Flow visualization and flow cytometry with holographic video microscopy,” *Opt. Express* **17**, 13071–13079 (2009).
108. F. C. Cheong, K. Xiao, D. G. Grier, “Characterization of individual milk fat globules with holographic video microscopy,” *J. Dairy Sci.* **92**, 95–99 (2009).
107. M. E. Leunissen, R. Dreyfus, F. C. Cheong, D. G. Grier, R. Sha, N. C. Seeman, P. M. Chaikin, “Switchable self-protected attractions in DNA-functionalized colloids,” *Nature Materials* **8**, 590–595 (2009).
106. B. Sun, D. G. Grier, “Comment: The effect of Mie resonances on trapping in optical tweezers,” *Opt. Express* **17**, 2658–2660 (2009).
105. B. Sun, J. Lin, E. Darby, A. Y. Grosberg, D. G. Grier, “Brownian vortexes,” *Phys. Rev. E* **80**, 010401(R) (2009).
104. F. C. Cheong, S. Duarte, S.-H. Lee, D. G. Grier, “Holographic microrheology of polysaccharides from *Streptococcus mutans* biofilms,” *Rheol. Acta* **48**, 109–115 (2008).
103. M. Polin, Y. Roichman, D. G. Grier, “Autocalibrated colloidal interaction measurements with extended optical traps,” *Phys. Rev. E* **77**, 051401 (2008).
102. Y. Roichman, B. Sun, Y. Roichman, J. Amato-Grill, D. G. Grier, “Optical forces arising from phase gradients,” *Phys. Rev. Lett.* **100**, 013602 (2008).
101. Y. Roichman, B. Sun, A. Stolarski, D. G. Grier, “Influence of non-conservative optical forces on the dynamics of optically trapped colloidal spheres: The fountain of probability,” *Phys. Rev. Lett.* **101**, 128301 (2008).
100. B. Sun, Y. Roichman, D. G. Grier, “Theory of holographic optical trapping,” *Opt. Express* **16**, 15765–15776 (2008).
99. S.-H. Lee, D. G. Grier, “Holographic microscopy of holographically trapped three-dimensional structures,” *Opt. Express* **15**, 1505–1512 (2007).
98. S.-H. Lee, Y. Roichman, G.-R. Yi, S.-H. Kim, S.-M. Yang, A. van Blaaderen, P. van Oostrum, D. G. Grier, “Characterizing and tracking single colloidal particles with video holographic microscopy,” *Opt. Express* **15**, 18275–18282 (2007).
97. M. Polin, D. G. Grier, Y. Han, “Colloidal electrostatic interactions near a conducting surface,” *Phys. Rev. E* **76**, 041406 (2007).

96. Y. Roichman, G. M. Zaslavsky, D. G. Grier, “Anomalous collective dynamics in optically driven colloidal rings,” *Phys. Rev. E* **75**, 020401(R) (2007).
95. Y. Roichman, V. Wong, D. G. Grier, “Colloidal transport through optical tweezer arrays,” *Phys. Rev. E* **75**, 011407 (2007).
94. Y. Roichman, D. G. Grier, “Three-dimensional holographic ring traps,” *Proc. SPIE* **6483**, 64830F (2007).
93. D. G. Grier, Y. Roichman, “Holographic optical trapping,” *Appl. Opt.* **45**, 880–887 (2006).
92. Y. Han, D. G. Grier, “Colloidal electroconvection in a thin horizontal cell: II. Bulk electroconvection of water during parallel-plate electrolysis,” *J. Chem. Phys.* **125**, 144706 (2006).
91. S.-H. Lee, D. G. Grier, “Giant colloidal diffusivity on corrugated optical vortices,” *Phys. Rev. Lett.* **96**, 190601 (2006).
90. M. Polin, D. G. Grier, S. R. Quake, “Anomalous vibrational dispersion in holographically trapped colloidal arrays,” *Phys. Rev. Lett.* **96**, 088101 (2006).
89. Y. Roichman, D. G. Grier, “Projecting extended optical traps with shape-phase holography,” *Opt. Lett.* **31**, 1675–1677 (2006).
88. Y. Roichman, A. S. Waldron, E. Gardel, D. G. Grier, “Performance of optical traps with geometric aberrations,” *Appl. Opt.* **45**, 3425–3429 (2006).
87. Y. Roichman, I. Cholis, D. G. Grier, “Volumetric imaging of holographic optical traps,” *Opt. Express* **14**, 10907–10912 (2006).
86. R. Agarwal, K. Ladavac, Y. Roichman, G. Yu, C. M. Lieber, D. G. Grier, “Manipulation and assembly of nanowires with holographic optical traps,” *Opt. Express* **13**, 8906–8912 (2005).
85. Y. Han, D. G. Grier, “Colloidal electroconvection in a thin horizontal cell I. Microscopic cooperative patterns at low voltage,” *J. Chem. Phys.* **122**, 164701 (2005).
84. Y. Han, D. G. Grier, “Configurational temperatures and interactions in charge-stabilized colloid,” *J. Chem. Phys.* **122**, 064907 (2005).
83. K. Ladavac, D. G. Grier, “Colloidal hydrodynamic coupling in concentric optical vortices,” *Europhys. Lett.* **70**, 548–554 (2005).
82. S.-H. Lee, K. Ladavac, M. Polin, D. G. Grier, “Observation of flux reversal in a symmetric optical thermal ratchet,” *Phys. Rev. Lett.* **94**, 110601 (2005).
81. S.-H. Lee, D. G. Grier, “Flux reversal in a two-state symmetric optical thermal ratchet,” *Phys. Rev. E* **71**, 060102(R) (2005).
80. S.-H. Lee, D. G. Grier, “Robustness of holographic optical traps against phase scaling errors,” *Opt. Express* **13**, 7458–7465 (2005).
79. S.-H. Lee, D. G. Grier, “One-dimensional optical thermal ratchets,” *J. Phys.: Condens. Matter* **17**, S3685–S3695 (2005).
78. M. Polin, K. Ladavac, S.-H. Lee, Y. Roichman, D. G. Grier, “Optimized holographic optical traps,” *Opt. Express* **13**, 5831–5845 (2005).
77. Y. Roichman, D. G. Grier, “Holographic assembly of quasicrystalline photonic heterostructures,” *Opt. Express* **13**, 5434–5439 (2005).
76. S. Sundbeck, I. Gruzberg, D. G. Grier, “Structure and scaling of helical modes of light,” *Opt. Lett.* **30**, 477–479 (2005).

75. A. Gopinathan, D. G. Grier, “Statistically locked-in transport in periodic potential landscapes,” *Phys. Rev. Lett.* **92**, 130602 (2004).
74. D. G. Grier, Y. Han, “Anomalous interactions in confined charge-stabilized colloid,” *J. Phys.: Condens. Matter* **16**, S4145–S4157 (2004).
73. Y. Han, D. G. Grier, “Configurational temperature of charge-stabilized colloidal monolayers,” *Phys. Rev. Lett.* **92**, 148301 (2004).
72. K. Ladavac, K. Kasza, D. G. Grier, “Sorting by periodic potential energy landscapes: Optical fractionation,” *Phys. Rev. E* **70**, 010901(R) (2004).
71. K. Ladavac, D. G. Grier, “Microoptomechanical pump assembled and driven by holographic optical vortex arrays,” *Opt. Express* **12**, 1144–1149 (2004).
70. M. Pelton, D. G. Grier, P. Guyot-Sionnest, “Power spectrum of blinking quantum dots,” *Appl. Phys. Lett.* **85**, 819–821 (2004).
69. M. Pelton, K. Ladavac, D. G. Grier, “Transport and fractionation in periodic potential-energy landscapes,” *Phys. Rev. E* **70**, 031108 (2004).
68. J. Plewa, E. Tanner, D. M. Mueth, D. G. Grier, “Processing carbon nanotubes with holographic optical tweezers,” *Opt. Express* **12**, 1978–1981 (2004).
67. S. H. Behrens, J. Plewa, D. G. Grier, “Measuring a colloidal particle’s interaction with a flat surface under nonequilibrium conditions,” *Euro. Phys. J. E* **10**, 115–121 (2003).
66. J. E. Curtis, D. G. Grier, “Structure of optical vortices,” *Phys. Rev. Lett.* **90**, 133901 (13 2003).
65. J. E. Curtis, D. G. Grier, “Modulated optical vortices,” *Opt. Lett.* **28**, 872–874 (2003).
64. D. G. Grier, “A revolution in optical manipulation,” *Nature* **424**, 810–816 (2003).
63. Y. Han, D. G. Grier, “Vortex rings in a constant electric field,” *Nature* **424**, 267 (2003).
62. Y. Han, D. G. Grier, “Confinement-induced colloidal attractions in equilibrium,” *Phys. Rev. Lett.* **91**, 038302 (2003).
61. B. A. Koss, D. G. Grier, “Optical peristalsis,” *Appl. Phys. Lett.* **82**, 3985–3987 (2003).
60. J. E. Curtis, B. A. Koss, D. G. Grier, “Dynamic holographic optical tweezers,” *Opt. Commun.* **207**, 169–175 (2002).
59. A. Gopinathan, T. Zhou, S. N. Coppersmith, L. P. Kadanoff, D. G. Grier, “Weak long-ranged Casimir attraction in colloidal crystals,” *Europhys. Lett.* **57**, 451–457 (2002).
58. P. T. Korda, G. C. Spalding, E. R. Dufresne, D. G. Grier, “Nanofabrication with holographic optical tweezers,” *Rev. Sci. Instrum.* **73**, 1956–1957 (2002).
57. P. T. Korda, G. C. Spalding, D. G. Grier, “Evolution of a colloidal critical state in an optical pinning potential,” *Phys. Rev. B* **66**, 024504 (2002).
56. P. T. Korda, M. B. Taylor, D. G. Grier, “Kinetically locked-in colloidal transport in an array of optical tweezers,” *Phys. Rev. Lett.* **89**, 128301 (2002).
55. S. H. Behrens, D. G. Grier, “The pair interaction of charged colloidal spheres near a charged wall,” *Phys. Rev. E* **64**, 050401(R) (2001).
54. S. H. Behrens, D. G. Grier, “The charge on glass and silica surfaces,” *J. Chem. Phys.* **115**, 6716–6721 (2001).
53. E. R. Dufresne, D. Altman, D. G. Grier, “Brownian dynamics of a sphere between parallel walls,” *Europhys. Lett.* **53**, 264–270 (2001).

52. E. R. Dufresne, G. C. Spalding, M. T. Dearing, S. A. Sheets, D. G. Grier, "Computer-generated holographic optical tweezer arrays," *Rev. Sci. Instrum.* **72**, 1810–1816 (2001).
51. D. G. Grier, S. H. Behrens, "Interactions in colloidal suspensions: Electrostatics, hydrodynamics and their interplay," in *Electrostatic Effects in Biophysics and Soft Matter*, ed. by C. Holm, P. Kékicheff, R. Podgornik (Kluwer, Dordrecht, 2001).
50. P. T. Korda, D. G. Grier, "Annealing thin colloidal crystals with optical gradient forces," *J. Chem. Phys.* **114**, 7570–7573 (2001).
49. E. R. Dufresne, T. M. Squires, M. P. Brenner, D. G. Grier, "Hydrodynamic coupling of two Brownian spheres to a planar surface," *Phys. Rev. Lett.* **85**, 3317–3320 (2000).
48. D. G. Grier, J. C. Crocker, "Comment on 'Monte Carlo study of structural ordering in charged colloids using a long-range attractive potential'," *Phys. Rev. E* **61**, 980–982 (2000).
47. D. G. Grier, "When like charges attract: Interactions and dynamics in charge-stabilized colloidal suspensions," *J. Phys.: Condens. Matter* **12**, A85–A94 (2000).
46. G. M. Zinkl, B. I. Zwiebel, D. G. Grier, D. Preuss, "Pollen-stigma adhesion in Arabidopsis: a species-specific interaction mediated by lipophilic molecules in the pollen exine," *Development* **126**, 5431–5440 (2000).
45. E. R. Dufresne, D. G. Grier, "Interactions, dynamics, and elasticity in charge-stabilized colloidal crystals (vol. 109, pg. 8659, 1998)," *J. Chem. Phys.* **110**, 8845–8845 (1999).
44. J. C. Crocker, D. G. Grier, "Interactions and dynamics in charge-stabilized colloid," *MRS Bull.* **23**, 24–31 (1998).
43. E. R. Dufresne, D. G. Grier, "Optical tweezer arrays and optical substrates created with diffractive optical elements," *Rev. Sci. Instrum.* **69**, 1974–1977 (1998).
42. D. G. Grier, "Colloids: A surprisingly attractive couple," *Nature* **393**, 621–623 (1998).
41. D. G. Grier, "From dynamics to devices: Directed self-assembly of colloidal materials," *MRS Bull.* **23**, 21 (1998).
40. M. Mungan, C.-H. Sow, S. N. Coppersmith, D. G. Grier, "Determining pair interactions from structural correlations," *Phys. Rev. B* **58**, 14588–14593 (1998).
39. C.-H. Sow, K. Harada, A. Tonomura, G. Crabtree, D. G. Grier, "Measurement of the vortex pair interaction potential in a Type-II superconductor," *Phys. Rev. Lett.* **80**, 2693–2696 (1998).
38. J. A. Weiss, A. E. Larsen, D. G. Grier, "Interactions, dynamics, and elasticity in charge-stabilized colloidal crystals," *J. Chem. Phys.* **109**, 8659–8666 (1998).
37. D. G. Grier, "Optical tweezers in colloid and interface science," *Cur. Opin. Colloid Interface Sci.* **2**, 264–270 (1997).
36. D. G. Grier, "Colloids make ultrafast optical devices," *Phys. World* **10**, 24–25 (1997).
35. D. G. Grier, "New age crystals," *Nature* **389**, 784–785 (1997).
34. A. E. Larsen, D. G. Grier, "Like-charge attractions in metastable colloidal crystallites," *Nature* **385**, 230–233 (1997).
33. J. K. Lin, D. G. Grier, J. D. Cowan, "Faithful representation of separable distributions," *Neural Computation* **9**, 1305–1320 (1997).
32. J. K. Lin, D. G. Grier, J. D. Cowan, "Feature extraction approach to blind source separation," in *Neural Networks for Signal Processing VII*, ed. by J. Principe (IEEE, 1997).

31. K. M. Abkemeier, D. G. Grier, "Topological disorder and conductance fluctuations in thin films," *Phys. Rev. B* **54**, 2723–2727 (1996).
30. K. M. Abkemeier, D. G. Grier, "Topological disorder and conductance fluctuations in granular thin films," in *Amorphous Silicon Technology - 1996* (MRS, New York, 1996), vol. 407, pp. 271–274.
29. J. C. Crocker, D. G. Grier, "Methods of digital video microscopy for colloidal studies," *J. Colloid Interface Sci.* **179**, 298–310 (1996).
28. J. C. Crocker, D. G. Grier, "When like charges attract: The effects of geometrical confinement on long-range colloidal interactions," *Phys. Rev. Lett.* **77**, 1897–1900 (1996).
27. D. G. Grier, C. A. Murray, "Direct imaging of the local dynamics of colloidal phase transitions," in *Ordering and Phase Transitions in Colloidal Systems*, ed. by A. K. Arora, B. V. R. Tata (VCH, New York, 1996), pp. 69–100.
26. D. G. Grier, "On the points of melting," *Nature* **379**, 773–775 (1996).
25. D. G. Grier, "Phases of matter: Review of "Principles of Condensed Matter Physics" by P. M. Chaikin and T. C. Lubensky," *Science* **273**, 1348 (1996).
24. A. E. Larsen, D. G. Grier, "Melting of metastable crystallites in charge-stabilized colloidal suspensions," *Phys. Rev. Lett.* **76**, 3862–3865 (1996).
23. J. K. Lin, D. G. Grier, "Stability of densely branched growth in dissipative diffusion controlled systems," *Phys. Rev. E* **54**, 2690–2695 (1996).
22. D. M. Mueth, J. C. Crocker, S. E. Esipov, D. G. Grier, "Origin of stratification in creaming emulsions," *Phys. Rev. Lett.* **77**, 578–581 (1996).
21. C. A. Murray, D. G. Grier, "Video microscopy of monodisperse colloidal systems," *Annu. Rev. Phys. Chem.* **47**, 421–462 (1996).
20. A. E. Larsen, D. G. Grier, T. C. Halsey, "Double layer relaxation at rough electrodes," *Phys. Rev. E* **52**, R2161–R2164 (1995).
19. C. A. Murray, D. G. Grier, "Colloidal crystals," *Am. Sci.* **83**, 238–245 (1995).
18. J. A. Weiss, D. W. Oxtoby, D. G. Grier, C. A. Murray, "Martensitic transition in a confined colloidal suspension," *J. Chem. Phys.* **103**, 1180–1190 (1995).
17. J. C. Crocker, D. G. Grier, "Microscopic measurement of the pair interaction potential of charge-stabilized colloid," *Phys. Rev. Lett.* **73**, 352–355 (1994).
16. D. G. Grier, C. A. Murray, "The microscopic dynamics of freezing in supercooled colloidal fluids," *J. Chem. Phys.* **100**, 9088–9095 (1994).
15. A. E. Larsen, D. G. Grier, T. C. Halsey, "Scaling in the frequency-dependent admittance of electrodeposited fractal electrodes," *Fractals* **2**, 191–200 (1994).
14. T. L. Morkved, P. Wiltzius, H. M. Jaeger, D. G. Grier, T. A. Witten, "Mesoscopic self-assembly of gold islands on diblock-copolymer films," *Appl. Phys. Lett.* **64**, 422–424 (1994).
13. D. G. Grier, D. Mueth, "Dissipation, geometry, and the stability of the dense radial morphology," *Phys. Rev. E* **48**, 3841–3848 (1993).
12. D. G. Grier, C. A. Murray, "Video microscopy of charge-stabilized colloidal suspensions," in *Structure and Dynamics of Strongly Interacting Colloids and Supramolecular Aggregates in Solution*, ed. by S.-H. Chen, J. S. Huang, P. Tartaglia (Kluwer Academic Publishers, Dordrecht, 1992), pp. 145–174.

11. C. A. Bolle, P. L. Gammel, D. G. Grier, C. A. Murray, D. J. Bishop, D. B. Mitzi, A. Kapitulnik, "Observation of a commensurate array of flux chains in tilted flux lattices in Bi-Sr-Ca-Cu-O single crystals," *Phys. Rev. Lett.* **66**, 112–115 (1991).
10. D. G. Grier, C. A. Murray, C. A. Bolle, P. L. Gammel, D. J. Bishop, D. B. Mitzi, A. Kapitulnik, "Translational and bond-orientational order in the vortex lattice of the high-Tc superconductor $\text{Bi}_{2.1}\text{Sr}_{1.9}\text{Ca}_{0.9}\text{Cu}_2\text{O}_{8+\delta}$," *Phys. Rev. Lett.* **66**, 2270–2273 (1991).
9. D. G. Grier, K. Allen, R. S. Goldman, L. M. Sander, R. Clarke, "Superlattices and long-range order in electrodeposited dendrites," *Phys. Rev. Lett.* **64**, 2152–2155 (1990).
8. L. M. Sander, D. Grier, "Fractals and patterns in electrodeposition," in *Fractals, Physical Origin and Properties*, ed. by L. Pietronero (Plenum Press, New York, 1989), pp. 229–237.
7. E. Ben-Jacob, P. Garik, T. Mueller, D. Grier, "Characterization of morphology transitions in diffusion-controlled systems," *Phys. Rev. A* **38**, 1370–1380 (1988).
6. R. Clarke, W. Dos-Passos, K. Bajema, R. Merlin, T. Moustakas, D. Grier, "Structural fluctuations and randomness in $\text{GaAs-Al}_x\text{Ga}_{1-x}\text{As}$ superlattices," *Superlattices Microstructures* **4**, 371–374 (1988).
5. N. Hecker, D. G. Grier, L. M. Sander, "Dense growth in electrochemical deposition," in *Fractal Aspects of Materials: Disordered Systems*, ed. by D. A. Weitz, L. M. Sander, B. B. Mandelbrot (Materials Research Society, Pittsburgh, PA, 1988), pp. 17–19.
4. E. Ben-Jacob, P. Garik, D. Grier, "Interfacial pattern formation far from equilibrium," *Superlattices Microstructures* **3**, 599–615 (1987).
3. D. G. Grier, D. A. Kessler, L. M. Sander, "Stability of the dense radial morphology in diffusive pattern formation," *Phys. Rev. Lett.* **59**, 2315–2318 (1987).
2. G. Radnoczi, T. Vicsek, L. M. Sander, D. Grier, "Growth of fractal crystals in amorphous GeSe_2 films," *Phys. Rev. A* **35**, 4012–4015 (1987).
1. D. Grier, E. Ben-Jacob, R. Clarke, L. M. Sander, "Morphology and microstructure in electrochemical deposition of zinc," *Phys. Rev. Lett.* **56**, 1264–1267 (1986).

Patents

62. D. G. Grier, S.-h. Lee, F. C. Cheong, "Tracking and characterizing particles with holographic video microscopy," U.S. Patent 9,810,894 (2017).
61. D. G. Grier, F. C. Cheong, K. Xiao, "Automated real-time particle characterization and three-dimensional velocimetry with holographic video microscopy," U.S. Patent 9,719,911 (2017).
60. F. C. Cheong, K. Xiao, D. Pine, D. G. Grier, "Method and system for measuring porosity of particles," U.S. Patent 9,519,129 (2016).
59. D. G. Grier, F. C. Cheong, K. Xiao, "Automated real-time particle characterization and three-dimensional velocimetry with holographic video microscopy," U.S. Patent 9,316,578 (2016).
58. H. Shpaisman, B. J. Krishnatreya, D. G. Grier, "Holographic microrefractometer for determining refractive index of a medium," U.S. Patent 9,188,529 (2015).
57. D. G. Grier, S.-h. Lee, Y. Roichman, "Optical solenoid beams," U.S. Patent 8,922,857 (2014).
56. D. G. Grier, E. R. Shanblatt, "Extended and knotted optical traps in three dimensions," U.S. Patent 8,921,763 (2014).

55. D. G. Grier, S.-h. Lee, F. C. Cheong, "Tracking and characterizing particles with holographic video microscopy," U.S. Patent 8,791,985 (2014).
54. D. G. Grier, K. Xiao, "Sorting colloidal particles into multiple channels with optical forces: prismatic optical fractionation," U.S. Patent 8,766,169 (2014).
53. D. G. Grier, M. Polin, S.-h. Lee, Y. Roichman, K. Ladavac, "Manipulation of objects in potential energy landscapes," U.S. Patent 8,502,132 (2013).
52. Y. Roichman, I. Cholis, D. G. Grier, "Volumetric imaging of a holographic optical traps," U.S. Patent 8,472,094 (2013).
51. D. G. Grier, "Holographic microfabrication and characterization system for soft matter and biological systems," U.S. Patent 8,431,884 (2013).
50. D. G. Grier, Y. Roichman, W. Man, P. M. Chaikin, P. J. Steinhardt, "Assembly of quasicrystalline photonic heterostructures," U.S. Patent 8,394,708 (2013).
49. F. C. Cheong, D. G. Grier, S.-h. Lee, "Holographic microscopy of holographically trapped three-dimensional nanorod structures," U.S. Patent 8,331,019 (2012).
48. D. G. Grier, "Multi-color holographic optical trapping," U.S. Patent 8,298,727 (2012).
47. Y. Roichman, D. G. Grier, "Three-dimensional holographic ring traps," U.S. Patent 8,179,577 (2012).
46. Y. Roichman, B. Sun, Y. Roichman, J. Amato-grill, D. G. Grier, "System for applying optical forces from phase gradients," U.S. Patent 8,174,742 (2012).
45. D. Grier, E. Dufresne, "Apparatus and method for fabricating, sorting, and integrating materials with holographic optical traps," U.S. Patent 8,128,242 (2012).
44. Y. Roichman, I. Cholis, D. G. Grier, "Volumetric imaging of holographic optical traps," U.S. Patent 8,059,321 (2011).
43. D. G. Grier, Y. Roichman, W. Man, P. M. Chaikin, P. J. Steinhardt, "Assembly of quasicrystalline photonic heterostructures," U.S. Patent 7,981,774 (2011).
42. D. G. Grier, "Topologically multiplexed optical data communication," U.S. Patent 7,978,978 (2011).
41. D. G. Grier, M. Polin, S.-h. Lee, Y. Roichman, K. Ladavac, "Manipulation of objects in potential energy landscapes," U.S. Patent 7,973,275 (2011).
40. Y. Roichman, D. G. Grier, I. Cholis, "System for characterizing a light field," U.S. Patent 7,897,910 (2011).
39. D. G. Grier, "Holographic microfabrication and characterization system for soft matter and biological systems," U.S. Patent 7,847,238 (2010).
38. S.-h. Lee, D. G. Grier, "Holographic microscopy of holographically trapped three-dimensional structures," U.S. Patent 7,839,551 (2010).
37. Y. Roichman, I. Cholis, D. G. Grier, "Volumetric imaging of holographic optical traps," U.S. Patent 7,835,051 (2010).
36. D. G. Grier, R. Agarwal, G. Yu, C. M. Lieber, K. Ladavac, Y. Roichman, "System and method for processing nanowires with holographic optical tweezers," U.S. Patent 7,772,543 (2010).
35. D. G. Grier, S.-h. Lee, "Multi-color holographic optical traps," U.S. Patent 7,759,020 (2010).

34. D. G. Grier, "Topologically multiplexed optical data communication," U.S. Patent 7,742,700 (2010).
33. D. G. Grier, K. Ladavac, J. M. Barker, "System and method for holographic optical trap bonding," U.S. Patent 7,678,222 (2010).
32. D. G. Grier, E. R. Dufresne, "Apparatus and method for fabricating, sorting, and integrating materials with holographic optical traps," U.S. Patent 7,588,940 (2009).
31. D. G. Grier, "Solute characterization by optoelectronkinetic potentiometry in an inclined array of optical traps," U.S. Patent 7,586,684 (2009).
30. D. G. Grier, "Topologically multiplexed optical data communication," U.S. Patent 7,546,037 (2009).
29. Y. Roichman, D. G. Grier, I. Cholis, "Extended optical traps by shape-phase holography," U.S. Patent 7,491,928 (2009).
28. L. Gruber, K. Bradley, W. Lopes, R. Lancelot, J. Plewa, D. Grier, "System and method of sorting materials using holographic laser steering," U.S. Patent 7,482,577 (2009).
27. D. G. Grier, M. Polin, S.-h. Lee, Y. Roichman, K. Ladavac, "Manipulation of objects in potential energy landscapes," U.S. Patent 7,473,890 (2009).
26. D. G. Grier, L. Gruber, "Broad spectrum optically addressed sensor," U.S. Patent 7,390,461 (2008).
25. D. Grier, W. Lopes, "Apparatus and method to generate and control optical traps to manipulate small particles," U.S. Patent 7,351,953 (2008).
24. D. Grier, W. Lopes, E. Dufresne, "Apparatus, system and method for applying optical gradient forces," U.S. Patent 7,324,282 (2008).
23. L. Gruber, K. Bradley, W. Lopes, R. W. Lancelot, J. S. Plewa, D. G. Grier, "System and method of sorting materials using holographic laser steering," U.S. Patent 7,241,988 (2007).
22. D. G. Grier, "Optical fractionation methods and apparatus," U.S. Patent 7,233,423 (2007).
21. D. G. Grier, J. E. Curtis, "Transverse optical accelerator and generalized optical vortices," U.S. Patent 7,232,989 (2007).
20. D. G. Grier, E. R. Dufresne, "Apparatus for applying optical gradient forces," U.S. Patent 7,227,688 (2007).
19. J. E. Curtis, B. A. Koss, D. G. Grier, "Use of multiple optical vortices for pumping, mixing and sorting," U.S. Patent 7,176,445 (2007).
18. D. Grier, W. Lopes, "Apparatus and method to generate and control optical traps to manipulate small particles," U.S. Patent 7,161,140 (2007).
17. D. G. Grier, P. T. Korda, "Apparatus and process for the lateral deflection and separation of flowing particles by a static array of optical tweezers," U.S. Patent 7,137,574 (2006).
16. D. G. Grier, E. R. Dufresne, "Apparatus for applying optical gradient forces," U.S. Patent 7,133,203 (2006).
15. D. G. Grier, J. E. Curtis, "Transverse optical accelerator and generalized optical vortices," U.S. Patent 7,109,473 (2006).
14. D. G. Grier, E. R. Dufresne, J. E. Curtis, B. A. Koss, "Apparatus for using optical tweezers to manipulate materials," U.S. Patent 7,104,659 (2006).

13. D. G. Grier, S. H. Behrens, B. A. Koss, "Optical peristaltic pumping with optical traps," U.S. Patent 7,075,060 (2006).
12. J. E. Curtis, B. A. Koss, D. G. Grier, "Multiple optical vortices for manipulating particles," U.S. Patent 6,995,351 (2006).
11. D. G. Grier, E. R. Dufresne, "Apparatus and method for fabricating, sorting, and integrating materials with holographic optical traps," U.S. Patent 6,863,406 (2005).
10. J. E. Curtis, B. A. Koss, D. G. Grier, "Use of multiple optical vortices for pumping, mixing and sorting," U.S. Patent 6,858,833 (2005).
9. D. G. Grier, S. H. Behrens, "Optical peristaltic pumping with optical traps," U.S. Patent 6,847,032 (2005).
8. D. G. Grier, E. R. Dufresne, J. E. Curtis, B. A. Koss, "Apparatus for using optical tweezers to manipulate materials," U.S. Patent 6,846,084 (2005).
7. D. G. Grier, P. T. Korda, "Apparatus and process for the lateral deflection and separation of flowing particles by a static array of optical tweezers," U.S. Patent 6,797,942 (2004).
6. J. E. Curtis, B. A. Koss, D. G. Grier, "Use of multiple optical vortices for pumping, mixing and sorting," U.S. Patent 6,737,634 (2004).
5. D. G. Grier, S. H. Behrens, "Optical peristaltic pumping with optical traps," U.S. Patent 6,639,208 (2003).
4. D. G. Grier, E. R. Dufresne, J. E. Curtis, B. A. Koss, "Apparatus for using optical tweezers to manipulate materials," U.S. Patent 6,626,546 (2003).
3. D. G. Grier, E. R. Dufresne, "Method for applying optical gradient forces and moving material," U.S. Patent 6,624,940 (2003).
2. D. G. Grier, E. R. Dufresne, "Apparatus for using optical tweezers to manipulate materials," U.S. Patent 6,416,190 (2002).
1. D. G. Grier, E. R. Dufresne, "Apparatus for applying optical gradient forces," U.S. Patent 6,055,106 (2000).