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- Employment**
- **Professor** 07, 2017 – present
 - **Associate Professor** 07, 2013 – 06, 2017
 - **Assistant Professor** 08, 2007 – 06, 2013
 Physics Department, Hong Kong University of Science and Technology
 - **Postdoctoral fellow** 01, 2004 – 08, 2007
 University of Pennsylvania, USA
- Education**
- **Ph.D.** in Physics 09, 1998 – 12, 2003
 University of Chicago, USA
 - **B.S.** in Physics 09, 1994 – 06, 1998
 Peking University (Beijing University), China

Research

Experimental Soft Condensed Matter Physics and Statistical Physics

Journal Publications (* denotes corresponding author, 53 first-author or corresponding-author papers)

- [75] H. Zhang*, F. Liu, Y. Han*, Anisotropic-Isotropic transition of cages at the glass transition, preprint: <https://arxiv.org/abs/2305.04179>
- [74] Y. Peng*, W. Li, T. Still, A.G. Yodh, Y. Han*, In situ observation of coalescence of nuclei in colloidal crystal-crystal transitions, preprint: <https://doi.org/10.21203/rs.3.rs-2597967/v1>
- [73] W. Li, Y. Peng, T. Still, A.G. Yodh, Y. Han*, Nucleation kinetics and virtual melting in shear-induced crystal-crystal transitions, preprint: <https://doi.org/10.21203/rs.3.rs-1878428/v1>
- [72] J.-L. Barrat, ... Y. Han..., et al. Soft matter roadmap, *JPhys Materials*, (invited review) accepted (2023)
- [71] Z. Xu, M. Li, H. Zhang*, and Y. Han*, Generalization of the Hall-Petch and inverse Hall-Petch behaviors by tuning amorphous regions in 2D solids, *National Science Open*, 2, 20220058 (2023)
- [70] X.P. Wang*, B. Li*, M. Li, and Y. Han*, Polymorphic crystalline wetting layers on crystal surfaces, *Nat. Phys.* 19, 700 (2023)
- [69] Q. Zhang, W. Li, K. Qiao, and Y. Han*, Surface premelting and melting of colloidal glasses, *Sci. Adv.* 9, eadfl101 (2023)
- [68] H. Zhang*, C. Luo, Z. Zheng*, and Y. Han*, Effects of size ratio on particle packing in binary glasses, *Acta Mater.* 246, 118700 (2023)
- [67] H. Zhang*, F. Liu, G. Ungar, Z. Zheng, Q. Sun, and Y. Han*, A regime beyond the Hall-Petch and inverse-Hall-Petch regimes in ultrafine-grained solids, *Commun. Phys.* 5, 329 (2022)
- [66] P. Hua, B. Wang, C. Yu, Y. Han, and Q. Sun*, Shear-induced amorphization in nanocrystalline NiTi micropillars under large plastic deformation, *Acta Mater.* 241, 118358 (2022)
- [65] G. Xu, T. Huang, Y. Han*, and Y. Chen*, Morphologies and dynamics of free surfaces of crystals composed of active particles, *Soft Matter* 18, 8830 (2023)
- [64] T. Huang, C. Zeng*, H. Wang, Y. Chen, and Y. Han*, Internal-stress-induced solid-solid transition involving orientational domains of anisotropic particles, *Phys. Rev. E* 106, 014612 (2022)
- [63] Z. Zheng, X. Xu, Y. Wang, and Y. Han*, Hydrodynamic couplings of colloidal ellipsoids diffusing in channels, *J. Fluid. Mech.* 933, A40 (2022)
- [62] N.P. Kryuchkov, N.A. Dmitryuk, W. Li, P.V. Ovcharov, Y. Han, A.V. Sapelkin, and S.O.

- Yurchenko*, Mean-field model of melting in superheated crystals based on a single experimentally measurable order parameter, *Sci. Rep.* 11, 17963 (2021)
- [61] L. Guan, L. Tian, M. Hou, and Y. Han*, Dynamics of a vibration-driven single disk, *Sci. Rep.* 11 16561 (2021)
- [60] Z. Zheng, R. Ni, Y. Wang* and Y. Han*, Translational and rotational critical-like behaviors in the glass transition of colloidal ellipsoid monolayers, *Sci. Adv.* 7, eabd1958 (2021)
- [59] G. Xu, T. Huang, Y. Han*, and Y. Chen*, Morphologies and dynamics of the interfaces between active and passive phases, *Soft Matter* 17, 9607 (2021)
- [58] X. Wang, B. Li, X. Xu* and Y. Han*, Surface roughening, premelting and melting of monolayer and bilayer crystals, *Soft Matter* 17, 688 (2021)
- [57] C.T. Yip, M. Isobe, C.H. Chan, S. Ren, K.P. Wong, Q. Huo, C.S. Lee, Y.H. Tsang, Y. Han, and C.-H. Lam*, Direct evidence of void-induced structural relaxations in colloidal glass formers, *Phys. Rev. Lett.* 125, 258001 (2020)
- [56] W. Li, Y. Peng, Y. Zhang, T. Still, A.G. Yodh, and Y. Han*, Shear-assisted grain coarsening in colloidal polycrystals, *PNAS* 117, 24055 (2020)
- [54] H. Zhang, K. Qiao, and Y. Han*, Power laws in pressure-induced structural change of glasses, *Nat. Commun.* 11, 2005 (2020)
- [53] Y. Han*, Seeing crystal formation one particle at a time, *Nat. Mater.* 19, 377 (2020)
- [52] T. Huang, Y. Han*, and Y. Chen*, Melting and solid–solid transitions of two-dimensional crystals composed of Janus spheres, *Soft Matter*, 16, 3015 (2020)
- [51] Z. Wu, C. Ji, X. Zhao, Y. Han, K. Müllen, K. Pan, and M. Yin*, Green-light-triggered phase transition of azobenzene derivatives toward reversible adhesives, *J. Am. Chem. Soc.* 141, 7385 (2019)
- [50] H. Zhang, Q. Zhang, F. Wang, and Y. Han*, Glass studies in colloidal systems, invited review in *物理 (Physics)*, 48: 69-81 (2019)
- [49] F. Wang and Y. Han*, Transformations of body-centered cubic crystals composed of hard or soft spheres to liquids or face-centered cubic crystals, *J. Chem. Phys.* 150, 014504 (2019)
- [48] H. Zhang and Y. Han*, Compression-induced polycrystal-glass transition in binary crystals, *Phys. Rev. X* 8, 041023 (2018)
- [47] M. Liao, X. Xiao, S.-T. Chui, and Y. Han*, Grain boundary roughening transition in colloidal crystals, *Phys. Rev. X* 8, 021045 (2018)
- [46] F. Wang and Y. Han*, Phase transition studies at the single-particle level using colloidal systems, invited review in *物理 (Physics)* 47, 238 (2018)
- [45] J.E. Song, J.S. Park, B. Lee, S.B. Pyun, J. Lee, M.G. Kim, Y. Han, and E.C. Cho*, Tunable colloidal crystalline patterns on flat and periodically micro-patterned surfaces as anti-reflective layers and printable-erasable substrates, *Adv. Mater. Interfaces* 1800138 (2018) (Inside Cover)
- [44] F. Wang, Z. Wang, Y. Peng, Z. Zheng, and Y. Han*, Homogeneous melting near the superheat limit of hard-sphere crystals, *Soft Matter* 14, 2447 (2018) (Inside Front Cover)
- [43] X. Cao, H. Zhang, and Y. Han*, Release of free-volume bubbles by cooperative-rearrangement regions during the deposition growth of a colloidal glass, *Nat. Commun.* 8, 362 (2017)
- [42] Y. Su, P.-Y. Lai, B.J. Ackerson, X. Cao, Y. Han, and P. Tong*, Colloidal diffusion over a quasicrystalline-patterned surface, *J. Chem. Phys.* 146, 214903 (2017)
- [41] D. Zhou, F. Wang, B. Li, X. Lou, and Y. Han*, Glassy spin dynamics in geometrically frustrated buckled colloidal crystals, *Phys. Rev. X* 7, 021030 (2017)
- [40] Y. Peng, W. Li, F. Wang, T. Still, A.G. Yodh, and Y. Han*, Diffusive and martensitic nucleation kinetics in solid-solid transitions of colloidal crystals, *Nat. Commun.* 8, 14978 (2017)
- [39] F. Wang, D. Zhou, and Y. Han*, Melting of colloidal crystals, *Adv. Funct. Mater.* 26, 8903–8919 (2016) (invited review)
- [38] B. Li, F. Wang, D. Zhou, Y. Peng, R. Ni, and Y. Han*, Modes of surface premelting in attractive colloidal crystals, *Nature* 531, 485 (2016) (highlighted by *Nature Physics*)
- [37] B. Li, D. Zhou, and Y. Han*, Assembly and phase transitions within colloidal crystals, *Nat. Rev. Mater.* 1, 15011 (2016) (cover article)

- [36] W. Qi, Y. Peng, Y. Han, R.K. Bowles, and M. Dijkstra*, Non-classical nucleation in a solid-solid transition of confined hard spheres *Phys. Rev. Lett.* 115, 185701 (2015) (highlighted by *Editor's Suggestion*)
- [35] X. Cao, F. Wang, and Y. Han*, Ground-state phase-space structures of two dimensional $\pm J$ spin glasses: A network approach, *Phys. Rev. E* 91, 062135 (2015)
- [34] Z. Wang, F. Wang, Y. Peng, and Y. Han*, Direct observation of liquid nucleus growth in homogeneous melting of colloidal crystals, *Nat. Commun.* 6, 6942 (2015)
- [33] Y. Peng, F. Wang, Z. Wang, A. Alsayed, Z. Zhang, A.G. Yodh, and Y. Han*, Two-step nucleation processes in solid-solid phase transitions, *Nat. Mater.* 14, 101 (2015) (Cover Article)
- [32] Z. Zheng*, R. Ni, F. Wang, M. Dijkstra, Y. Wang, and Y. Han*, Structural signatures of dynamic heterogeneities in monolayers of colloidal ellipsoids, *Nat. Commun.* 5, 3829 (2014)
- [31] Y. Shokef*, Y. Han, A. Souslov, A.G. Yodh, and T.C. Lubensky, Buckled colloidal monolayers connect geometric frustration in soft and hard matter, *Soft Matter* 9, 6565 (2013)
- [30] Y. Han*, Using colloids to understand the dynamics of melting and crystallization, invited review in *物理 (Physics)* 42, 160 (2013)
- [29] Z. Zheng* and Y. Han*, Glass transitions in monolayers of colloidal ellipsoids, *AIP Conf. Proc.* 1518, 153 (2013)
- [28] Z. Wang, F. Wang, Y. Peng, Z. Zheng, and Y. Han*, Homogeneous melting of 3D superheated colloidal crystals, *AIP Conf. Proc.* 1518, 432 (2013)
- [27] X. Ma, W. Chen, Z. Wang, Y. Peng, Y. Han, and P. Tong*, Test of the universal scaling law of diffusion in colloidal monolayers, *Phys. Rev. Lett.* 110, 078302 (2013)
- [26] Z. Wang, F. Wang, Y. Peng, Z. Zheng, and Y. Han*, Imaging the homogenous nucleation during the melting of superheated colloidal crystals, *Science* 338, 87 (2012) (highlighted by *Science*, *Nature Materials* and *Physics Today*)
- [25] Y. Han* and D. Grier*, Colloidal electro-convection in a thin horizontal cell. III. Interfacial and transient patterns on electrodes, *J. Chem. Phys.* 137, 014504 (2012)
- [24] Y. Peng, F. Wang, M. Wong, and Y. Han*, Self-similarity of phase-space networks of frustrated spin models and lattice gas models, *Phys. Rev. E* 84, 051105 (2011)
- [23] Y. Peng, Z.R. Wang and Y. Han*, Melting of microgel colloidal crystals, *J. Phys.: Conf. Ser.* 319, 012010 (2011)
- [22] Z. Zheng, F. Wang and Y. Han*, Glass transitions in quasi-two-dimensional suspensions of colloidal ellipsoids, *Phys. Rev. Lett.* 107, 065702 (2011) (highlighted by *Editor's Suggestion* and *Physics Viewpoint*)
- [21] Y. Peng, Z.R. Wang, A.M. Alsayed, A.G. Yodh, and Y. Han*, Melting of multilayer colloidal crystals confined between two walls, *Phys. Rev. E* 83, 011404 (2011)
- [20] Z.R. Wang, W. Qi, Y. Peng, A.M. Alsayed, Y. Chen, P. Tong, and Y. Han*, Two features at the two-dimensional freezing transitions, *J. Chem. Phys.* 134, 034506 (2011)
- [19] W. Qi, Z.R. Wang, Y. Han*, and Y. Chen*, Melting in two-dimensional Yukawa systems: A Brownian dynamics simulation, *J. Chem. Phys.* 133, 234508 (2010)
- [18] Z. Zheng and Y. Han*, Self-diffusion in two-dimensional hard ellipsoid suspensions, *J. Chem. Phys.* 133, 124509 (2010)
- [17] Y. Peng, Z.R. Wang, A. Alsayed, A.G. Yodh, and Y. Han*, Melting of colloidal crystal films, *Phys. Rev. Lett.* 104, 205703 (2010) (featured by *Phys. Rev. Focus*)
- [16] Z.R. Wang, A. Alsayed, A.G. Yodh, and Y. Han*, Two-dimensional freezing criteria for crystallizing colloidal monolayers, *J. Chem. Phys.* 132, 154501 (2010) (selected by *Virtual Journal of Biological Physics Research*)
- [15] Y. Han*, Phase-space networks of the six-vertex model under different boundary conditions, *Phys. Rev. E* 81, 041118 (2010)
- [14] Y. Han*, Phase-space networks of geometrically frustrated systems, *Phys. Rev. E* 80, 051102 (2009)

- [13] Y. Han*, A.M. Alsayed, M. Nobili and A.G. Yodh, Quasi-two-dimensional diffusion of single ellipsoids: aspect ratio and confinement effects, *Phys. Rev. E* 80, 011403 (2009)
- [12] A. Latka, Y. Han, A. M. Alsayed, A.B. Schofield, A.G. Yodh, and P. Habdas*, Particle dynamics in colloidal suspensions above and below the glass-liquid re-entrance transition, *Europhys. Lett.* 86, 58001 (2009)
- [11] Y. Han*, Y. Shokef*, A. M. Alsayed, P. Yunker, T.C. Lubensky, and A.G. Yodh, Geometric frustration in buckled colloidal monolayers, *Nature* 456, 898 (2008)
- [10] Y. Han*, N. Y. Ha, A.M. Alsayed, and A.G. Yodh, Melting of two-dimensional diameter tunable colloidal crystals, *Phys. Rev. E* 77, 041406 (2008)
- [9] M. Polin, D.G. Grier*, and Y. Han, Colloidal electrostatic interactions near a conducting surface, *Phys. Rev. E* 76, 041406 (2007)
- [8] Y. Han, A.M. Alsayed, M. Nobili, J. Zhang, T.C. Lubensky*, and A.G. Yodh, Brownian motion of an ellipsoid, *Science* 314, 626 (2006)
- [7] Y. Han and D.G. Grier*, Colloidal electroconvection in a thin horizontal cell II: bulk electroconvection of water during parallel-plate electrolysis, *J. Chem. Phys.* 125, 144707, (2006)
- [6] Y. Han and D.G. Grier*, Colloidal patterns in a thin electrolysis cell I: microscopic cooperative structures, *J. Chem. Phys.* 122, 164701 (2005)
- [5] Y. Han and D.G. Grier*, Configurational temperatures and interactions in charge-stabilized colloid, *J. Chem. Phys.* 122, 064907 (2005)
- [4] D.G. Grier* and Y. Han, Anomalous attractions in confined charge-stabilized colloid, *J. Phys. Condens. Matt.* 16, S4145 (2004)
- [3] Y. Han and D.G. Grier*, Configurational temperature of charge-stabilized colloidal monolayer, *Phys. Rev. Lett.* 92, 148301 (2004)
- [2] Y. Han and D.G. Grier*, Confinement-induced colloidal attractions in equilibrium, *Phys. Rev. Lett.* 91, 038302 (2003)
- [1] Y. Han and D.G. Grier*, Vortex rings in a constant electric field, *Nature* 424, 267 (2003); *erratum Nature* 424, 510 (2003)

Invited Book Chapter

A. M. Alsayed, Y. Han and A. G. Yodh “Melting and Geometric Frustration in Temperature-Sensitive Colloids” p229-281 in "Microgel Suspensions, Fundamentals and Applications" WILEY-VCH, (2011)

Y. Han, Three chapters (“Introduction”, “Melting” and “Solid-solid transition”) in a Chinese book “胶体中的相变和自组装 Phase transitions and self-assembly in colloids” May, 2021 科学出版社 Science Press)

Invited Talks at Conferences

- The 6th International Soft Matter Conference, Osaka, Japan 9, 2023
- 9th International Discussion Meeting on Relaxation in Complex Systems (9IDMCRS), Chiba, Japan 8, 2023
- 4th Forum on Experimental Design and Computational Simulation of Advanced Structural Materials, Qingdao, China 6, 2023
- Yielding and Flow of Soft Matter Systems, Okinawa, Japan 2, 2023
- MRS Fall Meeting, Boston (online), USA 12, 2022
- Quantum Physics and Complex Systems, CityU, Hong Kong 12, 2022
- 12th Conference of Soft Matter and Biophysics, Wenzhou (online), China 10, 2022
- National Symposium on Amorphous Physics and Materials, Nanjing, China 4, 2021
- The Physics Society of Hong Kong Annual Conference, Hong Kong 7, 2020
- International Workshop on Emerging Scales in Granular Media, Hong Kong 1, 2020
- 2019 International Workshop on Glass Physics, Beijing, China 9, 2019

- Chinese Physics Society Fall Meeting, Zhengzhou, China 9, 2019
- Workshop on Computational Problems in Material Science, Wuhan, China 8, 2019
- 5th National Statistical Physics Conference, Hefei, China 7, 2019
- the Colloids and interface Symposia (COINS), Hong Kong, China 6, 2019
- 2019 International Workshop on Soft Matter & Biophysics Theories, Beijing, China 5, 2019
- 2019 ACS National Meeting, Orlando, Florida, USA 3, 2019
- 11th Conference of Soft Matter and Biophysics, Chongqing, China 11, 2018
- Xiamen Soft Matter Forum, Xiamen, China 11, 2018
- 10th Dynamics Days Asia Pacific (DDAP10), Xiamen, China 11, 2018
- Chinese Physics Society Fall Meeting, Dalian, China 9, 2018
- the 13th Sino-US Nano Symposium, Chengdu, China 6, 2018
- 4th Conference on Condensed Matter Physics, Shanghai, China 6, 2018
- Designer Soft Matter Workshop, Singapore 4, 2018
- Physics of Supercooled Liquids Workshop at IAS of CityU, Hong Kong 1, 2018
- Xiamen Soft Matter Forum, Xiamen, China 11, 2017
- KITS Workshop: From supercooled liquids to glasses, Beijing, China 8, 2017
- 4th National Statistical Physics Conference, Xi'An, China 7, 2017
- 91st ACS Colloids & Surface Symposium, New York, USA (keynote) 7, 2017
- 3rd Conference on Condensed Matter Physics, Shanghai, China 6, 2017
- 4th Soft Matter Workshop, Shenzhen, China 5, 2017
- 10th Conference of Soft Matter and Biophysics, Xiamen, China 3, 2017
- International workshop on glasses and related nonequilibrium systems Osaka, Japan 3, 2017
- Dutch-China Soft Matter Workshop, Xiamen, China 10, 2016
- Chinese Physics Society Fall Meeting, Beijing, China 9, 2016
- 3rd International Conference on Packing Problems, Shanghai, China 8, 2016
- Summer School of Soft Matters, Xiamen, China 8, 2016
- 2nd Conference on Condensed Matter Physics, Nanjing, China 7, 2016
- Collaborative Conference on 3D and Materials Research, Incheon, South Korea 6, 2016
- HKUST-IAS workshop on computational and mathematical problems in materials science,
Hong Kong 1, 2016
- CityU-PKU Joint Workshop on Disorder and Disordered Materials, Hong Kong 1, 2016
- Emergent Phenomena in Soft And Active Matter, Bangalore, India 1, 2016
- Complex Fluid National Meeting (CompFlu-2016), Pune, India 1, 2016
- 4th Soft Matter Workshop, Suzhou, China 10, 2015
- Dutch-China Soft Matter Workshop, Nijmegen, Netherlands 10, 2015
- KITPC workshop: Controlled structural formation of soft matter, Beijing, China 8, 2015
- 3rd National Statistical Physics Conference, Lanzhou, China (plenary) 7, 2015
- 2015 International Soft Matter Symposium, Foshan, Guangdong, China 5, 2015
- 9th Conference of Soft Matter and Biophysics, Wenzhou, China 11, 2014
- 3rd Soft Matter Workshop, Beijing, China 8, 2014
- Summer School of Theoretical Physics, Suzhou, China 7, 2014
- 13th Continuum Models and Discrete Systems (CMDS) International Conference,
Salt Lake City, USA (plenary talk) 7, 2014
- IAS Frontiers of Soft Matter Physics Conference, Hong Kong 1, 2014

- 2nd Soft Matter Workshop, Hefei, China 8, 2013
- KITPC: Complex Dynamics in Granular Systems, Beijing, China 6, 2013
- The Physics Society of Hong Kong Annual Conference, Hong Kong 6, 2013
- International Conference for Leading and Young Materials Scientists, Zhuhai, China 12, 2012
- 4th International Symposium on Slow Dynamics in Complex Systems, Sendai, Japan 12, 2012
- Chinese Physics Society Fall Meeting, Guangzhou, China 9, 2012
- 8th Conference of Soft Matter and Biophysics (plenary talk), Guiyang, China 8, 2012
- East Asia Joint Seminars on Statistical Physics, Suzhou, China 3, 2012
- APS March Meeting, Boston, USA 3, 2012
- 8th Mid-Atlantic Soft Matter Workshop, NIST, Maryland, USA 12, 2011
- 7th Chinese Complex Network Conference (plenary talk), Chengdu, China 10, 2011
- CSRC Statistical and Computational Physics Workshop, Beijing, China 6, 2011
- 12th Continuum Models and Discrete Systems (CMDS) International Conference, Kolkata, India 2, 2011
- 11th Asia Pacific Physics Conference, Shanghai, China 11, 2010
- Shanghai Jiaotong University—Biannual Workshop on the Frontiers of Interdisciplinary Sciences, Shanghai, China 05, 2010
- 6th Conference of Liquid and Soft Matter, Hefei, China 11, 2008
- Chinese Physics Society Fall Meeting, Nanjing, China 09, 2007
- 81st ACS Colloid and Surface Science Symposium, Delaware, USA 06, 2007
- Gordon Research Conference—Polymer Colloids, Tilton, CT, USA 06, 2005

Journal Editorship

- Member of Editorial Board of the journal “物理 (Physics)”, 2020 – present
- Associate Editor (Physics) of National Science Open 2022 – present

Award

- Founding member of The Young Academy of Science of Hong Kong 2018
- 14th Chinese Young Scientist Award in China (第十四屆中國青年科技獎) by the China Association of Science and the State Personnel Organization Department 2016
- 2nd prize of Natural Science Awards from Ministry of Education in China 教育部自然科學二等獎 (第二完成人) 2014
- Achievement in Asia Award (Robert T. Poe Prize, 全球華人物理和天文學會, 亞洲成就獎) by the International Organization of Chinese Physicists and Astronomers (OCPA) 2014
- HKUST School of Science Research Award 2012