Yang Hu | Résumé

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Education

University of Pittsburgh — **Pittsburgh, U.S.**
Ph.D. in *Physics*, GPA: 3.868/4 — *Aug.2017–present*
Advisor: Prof. Thomas P. Purdy

University of Pittsburgh — **Pittsburgh, U.S.**
M.S. in *Physics*, GPA: 3.81/4 — *Aug.2016–Aug.2017*

University of Science and Technology of China — **Hefei, China**
B.S. in *Physics* — *Sep.2012–July.2016*
Advisor: Prof. Jie Zeng

Selected Honors and Awards

Arts & Sciences Graduate Fellow — *Fall. 2021*

Projects

Electro-Optic Cavities for Quantum Transducers — ***May.2020–present***
With finite element simulation using the software COMSOL, I designed several kinds of all-dielectric microwave cavities. By incorporating it into an optical Fabry–Pérot cavity, microwave-to-optical photon transduction was achieved as clearly shown in measurements with vector network analyzer (VNA)

Quantum memory unit with high quality factor nanomechanical resonator — ***Mar.2021–present***
With COMSOL I designed several kinds of quartz mechanical resonators showing high quality factor and successfully made them after solving many fabrication problems. These resonators could serve as a quantum memory unit when coupled to superconducting qubits. For characterization, I've designed and built a vacuum chamber which will later incorporate with a laser doppler vibrometer and am setting up impedance microscope. A home-made chip-bonder was also built for binding quartz resonator chip with superconducting qubit chip with micron-level resolution

Development of single-electron and electron-pair sources in LaAlO3/SrTiO3 nanostructures — ***May.2017–May.2020***
I fabricated devices in the $LaAlO_3/SrTiO_3$ interface using conductive atomic force microscope lithography. From electron transport measurements at cryogenic temperature (about 20mK) with applied external magnetic field, signs of single-electron and electron-pair transport was observed, making the device a possible on-demand source of single electron and electron pair

Selected Talks and Presentations

2023 APS March Meeting **Las Vegas, U.S.**
Title: Quantum memory unit with high-Q nanomechanical resonator *Mar. 8, 2023*

2022 APS March Meeting **Chicago, U.S.**
Title: High-Q bulk acoustic resonator for building long-lived Quantum Memory *Mar. 14, 2022*

OSA Nonlinear Optics 2021 **Washington DC, U.S.**
Title: Microwave Photonic Crystals for Electro-Optic Quantum Transduction *Aug. 13, 2021*

PQI 2020 Poster Presentation **Pittsburgh, U.S.**
Title: Development of single-electron and electron-pair sources in LaAlO3/SrTiO3 nanostructures
Apr. 17, 2020

2019 APS March Meeting **Boston, U.S.**
Title: Development of single-electron sources in LaAlO3/SrTiO3 nanostructures *Mar. 5, 2019*

PQI 2018 Poster Presentation **Pittsburgh, U.S.**
Title: Single-electron source from LaAlO3/SrTiO3 System *Apr. 18, 2018*

Publications

[1] Qing Guo, Jianan Li, Hyungwoo Lee, Jung-Woo Lee, Yuhe Tang, Muqing Yu, ***Yang Hu***, Chang-Beom Eom, Patrick Irvin, and Jeremy Levy. "Longitudinal and transverse frictional drag in graphene/$LaAlO_3$/$SrTiO_3$ heterostructures". In: *Phys. Rev. B* 106 (4 July 2022), p. 045303. DOI: 10.1103/PhysRevB.106.045303.

[2] Dengyu Yang, Shan Hao, Jun Chen, Qing Guo, Muqing Yu, ***Yang Hu***, Kitae Eom, Jung-Woo Lee, Chang-Beom Eom, Patrick Irvin, and Jeremy Levy. "Nanoscale control of LaAlO3/SrTiO3 metal–insulator transition using ultra-low-voltage electron-beam lithography". In: *Applied Physics Letters* 117.25 (Dec. 2020). 253103. ISSN: 0003-6951. DOI: 10.1063/5.0027480. eprint: https://pubs.aip.org/aip/apl/article-pdf/doi/10.1063/5.0027480/14542866/253103_1_online.pdf.

[3] Jianan Li, Qing Guo, Lu Chen, Shan Hao, ***Yang Hu***, Jen-Feng Hsu, Hyungwoo Lee, Jung-Woo Lee, Chang-Beom Eom, Brian D'Urso, Patrick Irvin, and Jeremy Levy. "Reconfigurable edge-state engineering in graphene using LaAlO3/SrTiO3 nanostructures". In: *Applied Physics Letters* 114.12 (Mar. 2019). 123103. ISSN: 0003-6951. DOI: 10.1063/1.5080251. eprint: https://pubs.aip.org/aip/apl/article-pdf/doi/10.1063/1.5080251/13233426/123103_1_online.pdf.

Technical Skills

Programing Skills LabVIEW, MATLAB, Mathematica, Python

Software & Tools COMSOL, Igor Pro, Klayout, LayoutEditor, Autodesk Inventor

Experimental Skills Photolithography, electron-beam lithography, atomic force microscopy, scanning electron microscopy, focused ion beam microscopy, reactive-ion etching, electron-beam evaporation, thermal evaporation, plasma etching, reflectometry; wire bonding, low-temperature measurements, microwave measurement with VNA