

# Yang Hu | Résumé

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🌐 <https://yangshao96.github.io/> •  Yang Hu

## Education

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### University of Pittsburgh

Ph.D. in *Physics*, GPA: 3.868/4

Advisor: Prof. **Thomas P. Purdy**

**Pittsburgh, U.S.**

*Aug.2017–present*

### University of Pittsburgh

M.S. in *Physics*, GPA: 3.81/4

**Pittsburgh, U.S.**

*Aug.2016–Aug.2017*

### University of Science and Technology of China

B.S. in *Physics*

Advisor: Prof. **Jie Zeng**

**Hefei, China**

*Sep.2012–July.2016*

## Selected Honors and Awards

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*Arts & Sciences Graduate Fellow*

*Fall. 2021*

## Projects

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### 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 nanofabrication 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 $\text{LaAlO}_3/\text{SrTiO}_3$ nanostructures

*May.2017–May.2020*

In this project I fabricated devices in the  $\text{LaAlO}_3/\text{SrTiO}_3$  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

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<b>2023 APS March Meeting</b> <i>Title: Quantum memory unit with high-Q nanomechanical resonator</i>	<b>Las Vegas, U.S.</b> <i>Mar. 8, 2023</i>
<b>2022 APS March Meeting</b> <i>Title: High-Q bulk acoustic resonator for building long-lived Quantum Memory</i>	<b>Chicago, U.S.</b> <i>Mar. 14, 2022</i>
<b>OSA Nonlinear Optics 2021</b> <i>Title: Microwave Photonic Crystals for Electro-Optic Quantum Transduction</i>	<b>Washington DC, U.S.</b> <i>Aug. 13, 2021</i>
<b>PQI 2020 Poster Presentation</b> <i>Title: Development of single-electron and electron-pair sources in LaAlO<sub>3</sub>/SrTiO<sub>3</sub> nanostructures</i>	<b>Pittsburgh, U.S.</b> <i>Apr. 17, 2020</i>
<b>2019 APS March Meeting</b> <i>Title: Development of single-electron sources in LaAlO<sub>3</sub>/SrTiO<sub>3</sub> nanostructures</i>	<b>Boston, U.S.</b> <i>Mar. 5, 2019</i>
<b>PQI 2018 Poster Presentation</b> <i>Title: Single-electron source from LaAlO<sub>3</sub>/SrTiO<sub>3</sub> System</i>	<b>Pittsburgh, U.S.</b> <i>Apr. 18, 2018</i>

## Publications

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- [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<sub>3</sub>/SrTiO<sub>3</sub> heterostructures”. In: *Phys. Rev. B* 106 (4 July 2022), p. 045303. DOI: [10.1103/PhysRevB.106.045303](https://doi.org/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 LaAlO<sub>3</sub>/SrTiO<sub>3</sub> 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](https://doi.org/10.1063/5.0027480). eprint: [https://pubs.aip.org/aip/apl/article-pdf/doi/10.1063/5.0027480/14542866/253103\\_1\\_online.pdf](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 LaAlO<sub>3</sub>/SrTiO<sub>3</sub> nanostructures”. In: *Applied Physics Letters* 114.12 (Mar. 2019). 123103. ISSN: 0003-6951. DOI: [10.1063/1.5080251](https://doi.org/10.1063/1.5080251). eprint: [https://pubs.aip.org/aip/apl/article-pdf/doi/10.1063/1.5080251/13233426/123103\\_1\\_online.pdf](https://pubs.aip.org/aip/apl/article-pdf/doi/10.1063/1.5080251/13233426/123103_1_online.pdf).

## Technical Skills

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**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