

ZIHAN ZANG (臧梓涵)

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🎓 EDUCATION

Tsinghua University (THU), Beijing, China 2017 – Present

PhD student (Adviser: Prof. Yi Luo) in Electronics Engineering (EE), expected March 2023

Tsinghua University (THU), Beijing, China 2013 – 2016

B.S. in Electronics Engineering (EE)

👤 RESEARCH EXPERIENCE

Freeform lens/micro-optics design towards computational imaging 2021 – Present

- Inverse design of micro-optics/diffractive optical elements with grayscale lithography fabrication model. Design methods based on back-propagation and binary search are proposed. High-quality beam splitter and hologram are designed and fabricated.
- Fabrication of diffractive/refractive elements using grayscale lithography and nano-imprinting.
- Inverse design of freeform lens using back-propagation. A fast and differentiable ray-tracing simulator is developed.
- Use re-parameterization to train opto-electronic co-designed computer vision system based on a single-layer diffractive neural network. An arrayed diffractive optical element is employed as the optical layer, which enables 30% deduction of multiply-accumulate (MAC) operations on both VGG13 and ResNet18 models.

Spectrally scanning LiDAR 2018 – 2020

- Propose and implement *2D spectrally scanning LiDAR*, which only uses solid-state dispersive elements as beam scanners (grating + optical cavity). A simplified design theory of VIPA cavity as a 2D spatial disperser is proposed.
- Based on the cavity disperser design, we also achieved *ultrafast framerate LiDAR* (>1 kfps) with high resolution (>200 lines).
- Propose and implement *all-optical spectro-temporal encoded LiDAR* with record acquisition rate.
- Phase noise compensation algorithm for coherent LiDAR systems.
- Novel diffractive element that can *convert 1D beam steering into 2D beam steering*.

📖 SELECTED PUBLICATIONS

- **Zang, Z.**, Xu, Y., *et al.* (2022). *Spectrally Scanning LiDAR Based on Wide-Angle Agile Diffractive Beam Steering*. IEEE Photon. Technol. Lett., 34 (16), 850-853.
- **Zang, Z.**, Li, Z., *et al.* (2022). *Ultrafast parallel single-pixel LiDAR with all-optical spectro-temporal encoding*. APL Photonics, 7(4), 046102.
- **Zang, Z.**, Xu, Y., *et al.* (2021, October). *Ultrafast agile optical beam steering based on arrayed diffractive elements*. In Asia Communications and Photonics Conference (pp. T4D-6). Optical Society of America. **(Postdeadline paper, 1 out of 10)**
- Li, Z.*, **Zang, Z.***, *et al.* (2021). *Solid-state FMCW LiDAR with two-dimensional spectral scanning using a virtually imaged phased array*. Optics Express, 29(11), 16547-16562. **(Monthly top downloads of Optics Express journal)**
- Li, Z.*, **Zang, Z.***, *et al.* (2021). *Virtually imaged phased-array-based 2D nonmechanical beam-steering device for FMCW LiDAR*. Applied Optics, 60(8), 2177-2189.

⚙️ SKILLS

- Programming Languages: MATLAB == Python (PyTorch) > C++
- Software: ZEMAX, Lumerical FDTD, RSoft

♡ HONORS AND AWARDS

Institute Excellence scholarship, Tsinghua Shenzhen International Graduate School, Tsinghua University Oct. 2021