

Input Transparency

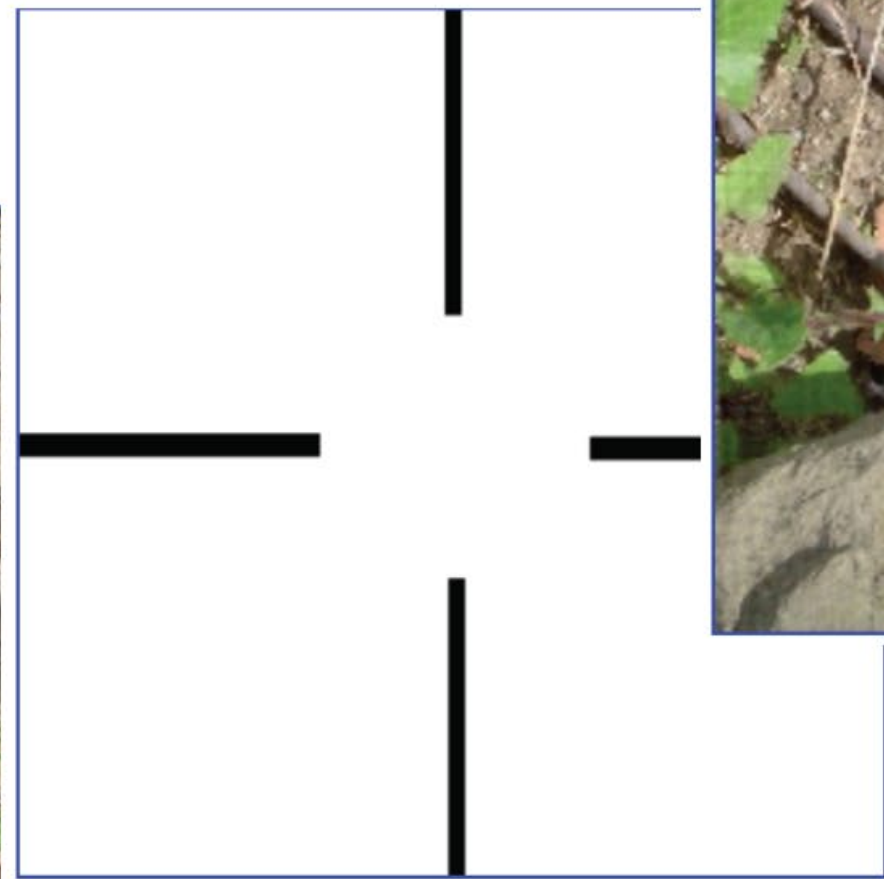


2-d Fourier Transform Plane

Original image.



Fourier filter.

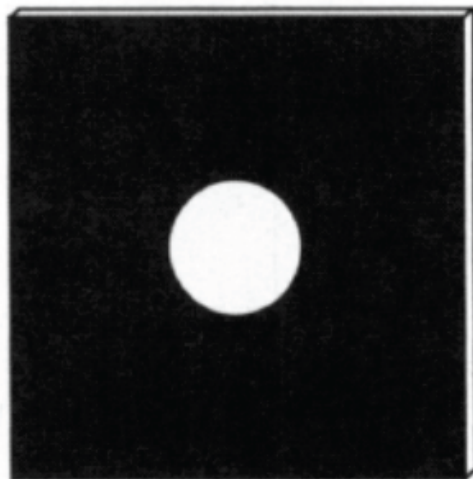
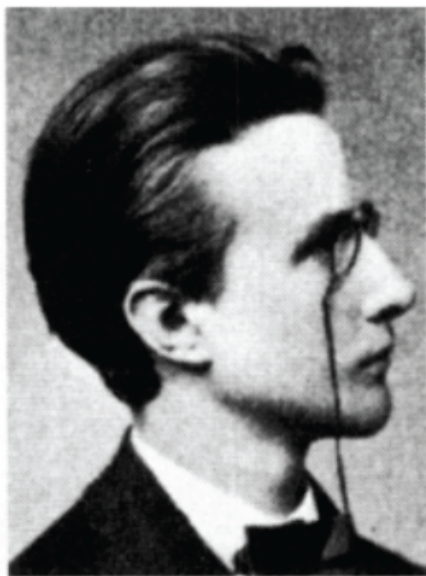


Object

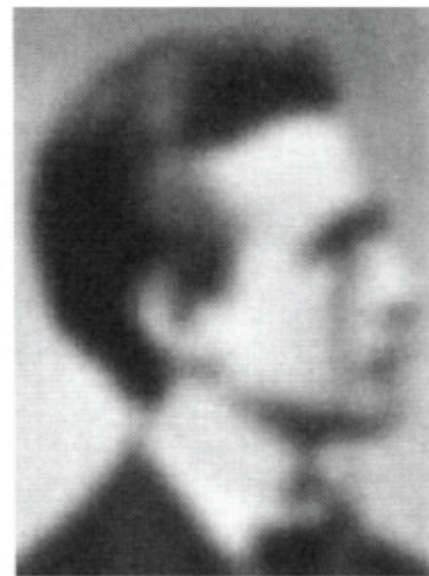
Mask

Image

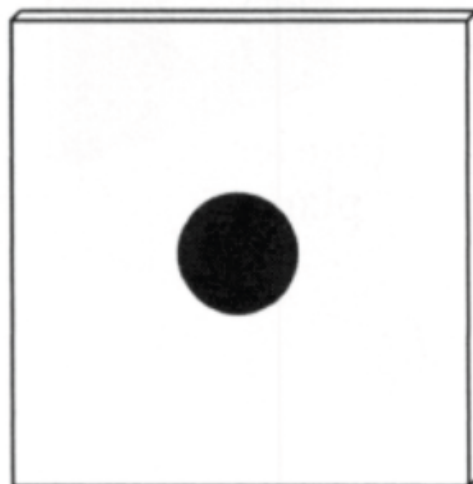
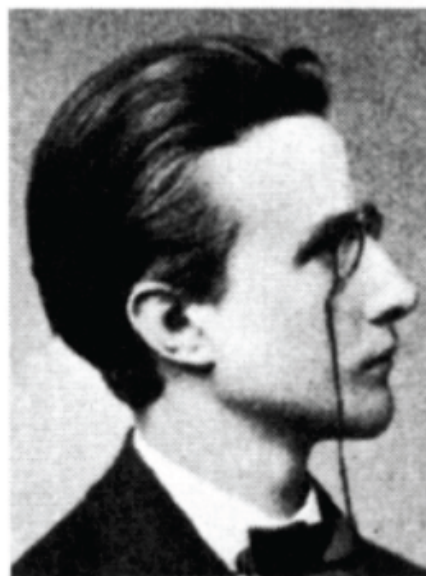
(a)



Low Pass Filter in
2-d Fourier Transform Plane



(b)

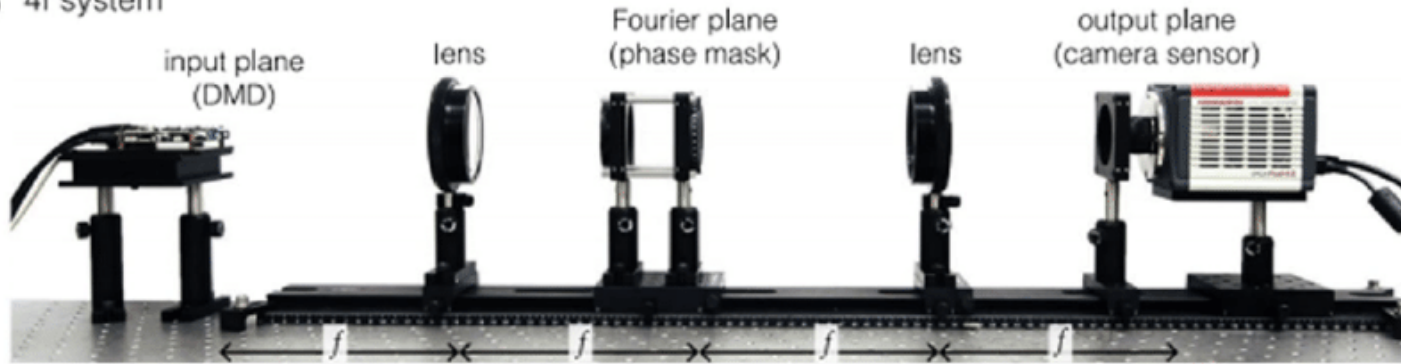


High Pass Filter in
2-d Fourier Transform Plane

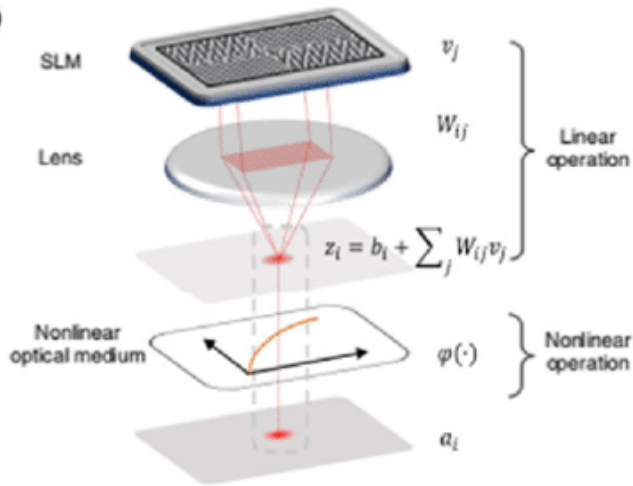


Optical neural networks with linear operation realized by Fourier transform of light

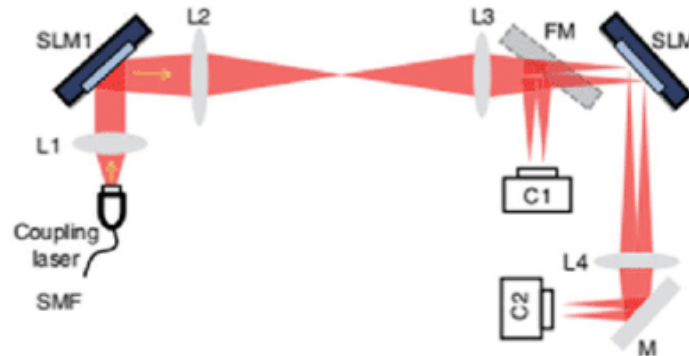
(a) 4f system



(b)



(c)



Digital Micromirror Device (DMD) is a spatial light modulator consisting of an array of millions of tiny, individually controlled mirrors, used primarily as a fast, programmable, binary amplitude mask in the Fourier or imaging plane

Spatial Light Modulator (SLM) is an electro-optical, pixelated device used to dynamically modulate the amplitude, phase, or polarization of a wavefront in real-time.

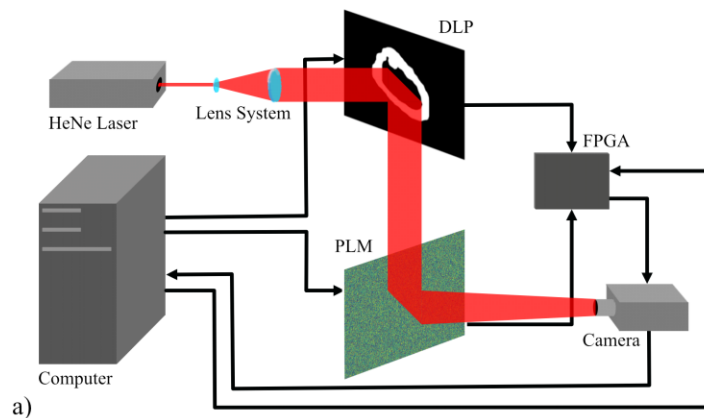
From: Liu, Jia & Wu, Qiuhaio & Sui, Xiubao & Chen, Qian & Gu, Guohua & Wang, Liping & Li, Shengcai. (2021).

Research progress in optical neural networks: theory, applications and developments. Photonix. 2. 10.1186/s43074-021-00026-0.

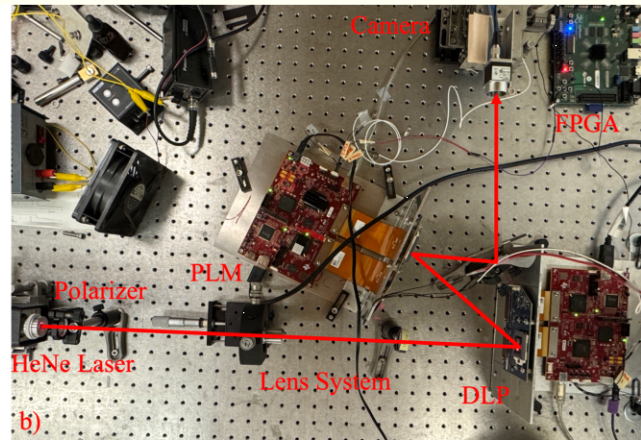
Implementation of an optical neural network in EECS Professor Ron Hui's Lab on West Campus

Optical Testbed

a) Block diagram of optical testbed



b) Image of optical testbed



Currently NSF funded project:
Title: TeTON: A Testbed and a Toolkit
for Expediting Investigation of and
Accelerating Advancements in All-
Optical Neural Networks