

## Abstract

Most conventional.....provide only 2D images where 3D information are either buried in 2D image or missing. Development of 3D microscopic image is a burning deasure in all branch of research domain so there is a great need for the microscopes that can capture the 3D image for use in biological research like studying neuron activity, brain structure of small biological specimens and cellular morphology. By now the most commonly used 3D imaging microscope is the confocal microscope. But this technique gives rise to bleaching and hard to apply to move and light sensitive samples. Light sheet microscopy was also developed based on the concept of an ultra-thin light sheet to image 3D dynamics. By aligning a microlens array between the object and image plane to a conventional microscope ,we can record a 4D light field and this microscopy technique is known as Light Field Microscopy .In this work, I have implemented a setup for 3D imaging of micrometer size sample(ex.neurons, zebrafish brain, optical fiber)using microlens array. This technique is known as light field microscopy which is different from conventional microscopy. In this setup, both 2D positional and 2D anglular information of the incident light is captured by aligning a microlens array between the camera sensor and image plane. I have captured 100um and 1mm diameter optical fiber and then tried to reconstruct the volume of the fiber. In the other half part, I tried to estimate the beam profile of laser diode using my designed setup.

