

# COMPACT NONLINEAR OPTICAL MESOSCOPE BY DICHOIC SCANNING

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Recently developed nonlinear optical mesoscope featuring its very large field of view (FOV) up to 5 mm diameter could be quite helpful in functional imaging of a large number of neurons simultaneously and the investigation of neural loop connection in mice cortex [1]. However this kind of system utilizes a long focal length as well as a large beam diameter up to 40 mm for the large FOV, leading to the customization of large galvanometer scanners and a huge objective lens. As a result, the size of the mesoscope system also increases dramatically.

In this paper authors present a compact nonlinear optical mesoscope by the dichroic scanning technology. Dichroic scanning technology eliminates previously indispensable scan lens and tube lens. A dichroic scanner is made by coating a specific dichroic optical thin film onto a transparent quartz plate of a galvanometer scanner and vibrates at the back focal plane of a customized objective lens [2, 3]. The full optical scan angle of the dichroic scanner is 30 degrees which is also the angle of field of the objective lens. Our system achieved 1.56 mm diameter FOV by 5 mm diameter incident beam and 3.4 mm diameter FOV by 9.25 mm diameter incident beam with the numerical aperture (NA) of  $\sim 0.75$ .

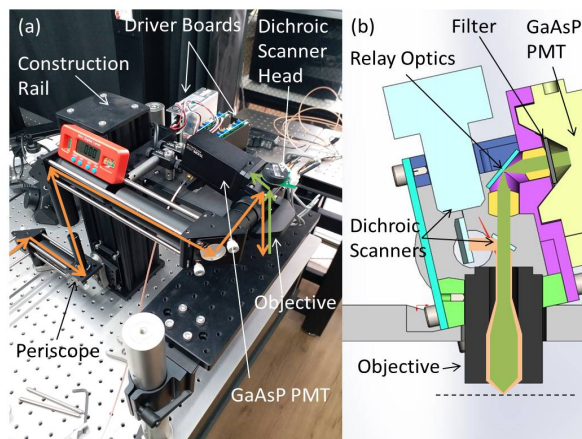


Figure 1: (a) Photo and (b) cross-sectional illustration of the compact nonlinear mesoscope.

## REFERENCES:

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