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Investigation of the feasibility of a wide-field depth resolved optical imaging method BEN CURATOLO, PEIFANG TIAN, Physics Department, John Carroll University — Since the extraordinary capabilities of the brain are tied to the interactions of large groups of neurons, it is crucial to visualize how neuronal groups work together to represent and process sensory information. Wide-field optical imaging can achieve this by mapping a large cortical area with good spatial and temporal resolution. The main drawback is that it cannot resolve depth information. Since light at longer wavelength experiences less scattering than light at shorter wavelength, thus, can penetrate deeper into the brain, we may access different depths of the brain by using multiple wavelengths of light. As a first step to build such a wide-field depth resolved optical imaging system, we have performed a numeric feasibility study using Monte Carlo simulation and evaluated the performance of the proposed system using two light sources at 455nm and 590nm, respectively. We have found that these two wavelengths can indeed access different depths of the brain tissue, thus, our proposed method is feasible.

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