

Abstract Submitted  
for the MAR15 Meeting of  
The American Physical Society

**Sorting of colors in the retina** EREZ RIBAK, AMICHAÏ LABIN, SHADI SAFURI, IDO PERLMAN, Technion - Israel Institute of Technology — Our image of the world is detected by photoreceptors, lying at the bottom of the nearly-transparent retina. Lateral neural layers for processing the image temporally, spectrally, and spatially come in front the photoreceptors, not behind them. This reverse order is a long-standing puzzle, which we wish to explain. We found out that cone photoreceptors are attached to metabolic Muller cells which span the retina. Cones provide colour vision at day time, and are surrounded by sensitive rods which function at night. We showed by an analytical and a computational method that the Müller cells also serve as fibre optics, concentrating green-red light into the cones, while the excessive blue is scattered to the nearby rods. Spatial and spectral laboratory measurements validate that indeed the shapes and refractive index values of the Muller cells and the surrounding retina separate the colours according to the spectral sensitivities of both cones and rods. These results also explain other effects of vision acuity and colour sensitivity. References A M Labin and E N Ribak, *Phys Rev Lett* 104, 158102 (2010). A M Labin, S K Safuri, E N Ribak and I Perlman, *Nature Comm* 5, 4319 (2014). A M Labin and E N Ribak, “Color sorting by retinal waveguides”. Submitted.

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Date submitted: 12 Nov 2014

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