1032-92-69 **Garrett T Kenyon*** (gkenyon@lanl.gov), Physics Division, P-21, P.O. Box 1663, MS D454, LANL, Los Alamos, NM 87545. *Singular Value Decomposition of Spatiotemporal Correlations in Computer-Generated Spike Trains.* Preliminary report.

Over the brief time intervals available for processing retinal images, roughly 50 to 300 msec, the number of extra spikes generated by individual retinal ganglion cells can be quite variable. Here, computer-generated spike trains were used to investigate how signal/noise might be improved by utilizing spatiotemporal correlations among retinal neurons responding to large, contiguous stimuli. Realistic correlations were produced by modulating the instantaneous firing rates of all stimulated neurons by a common oscillatory input whose amplitude and temporal structure was consistent with experimentally measured field potentials and correlograms. Whereas previous studies have typically measured synergy between pairs of ganglion cells examined one at a time, Singular Value Decomposition (SVD) was used to analyze over one million pairwise correlations simultaneously. Utilizing the information distributed across retinal neighborhoods commensurate in size to classical antagonistic surrounds, the largest singular vector of the pairwise correlation matrix yielded dramatic improvements in signal/noise in as little as 25 msec without sacrificing fine spatial detail. This encoding strategy may have evolved to minimize the number of spikes required to support rapid visual discrimination. (Received August 10, 2007)