

# Dynamics of stimulus-evoked spike timing correlations in the cat lateral geniculate nucleus

Ito, Hiroyuki

Maldonado, Pedro E.

Gray, Charles M.

Precisely synchronized neuronal activity has been commonly observed in the mammalian visual pathway. Spike timing correlations in the lateral geniculate nucleus (LGN) often take the form of phase synchronized oscillations in the high gamma frequency range. To study the relations between oscillatory activity, synchrony, and their time-dependent properties, we recorded activity from multiple single units in the cat LGN under stimulation by stationary spots of light. Autocorrelation analysis showed that approximately one third of the cells exhibited oscillatory firing with a mean frequency  $\approx 80$  Hz. Cross-correlation analysis showed that 30% of unit pairs showed significant synchronization, and 61% of these pairs consisted of synchronous oscillations. Crosscorrelation analysis assumes that synchronous firing is stationary and maintained throughout the period of stimulation. We tested this assumption by applying unitary events analysis (UEA). We found that UEA was more sensitive to weak and