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Phase dependent and independent responses in auditory cortex¹ DIDIER DEPIREUX, BARAK SHECHTER, U of Maryland Medical School, THEEARLAB TEAM — Responses of auditory neurons are often characterized by their spectro-temporal receptive field (STRF). This linear measure has been shown to capture the overall trend of the response, but by its nature, it does not reflect any nonlinear processing. We have recently shown that neurons in primary auditory cortex (AI) of the awake ferret respond with non-trivial nonlinearities (not solely the result of rectifying or saturating nonlinearities). We developed new techniques to reveal additional phase independent (DC) and dependent (quadratic) tuning in the tuning of single neurons. One of the assumptions in the STRF model is that the mean firing rate (averaged over any single period of the stimulus) does not depend on the spectro-temporal modulations, but rather on the overall level of the stimulus. The phase-independent tuning to the spectro-temporal envelope is analogous to complex visual neural responses, in which responses to an auditory grating stimulus do not depend on its spatial phase. We show the existence of neurons tuned in 1) a phase-independent manner, 2) a linear manner and 3) a quadratic manner to the time-frequency content of the spectral envelope of sounds.

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