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Contrast Amplification in a Texture Discrimination Task *L.G. Appelbaum*[1], *Z.L. Lu*[2], *G. Sperling*[1]. U. California, Irvine[1]; U. Southern California[2].

Purpose To demonstrate contrast amplification in slant discrimination. Current models for the detection of motion direction[1] and of texture slant[2] use a quadrature principle: the squared outputs of receptive fields with a similar orientation in x,t (for motion) and x,y (for slant) are summed to determine the motion energy and slant energy at that orientation. A consequence of such quadrature models is that amplification of subthreshold stimuli can be observed in certain types of displays[3]. **Method**. Consider discrimination between two square-wave gratings, oriented at +X and -X deg. These are sampled every 90 deg so that one cycle of the grating is represented by four successive rows shifted by 90 deg (Fig). In the control condition all rows have the same contrast M_t; we determine the minimum M_t for +X -X slant discrimination. In the amplification condition, even rows have contrast M_e, odd rows M_o. The quadrature model predicts that discrimination depends on the product, M_eM_o. Therefore, large values of M_e combined with subthreshold values of M_o would still produce good slant discrimination. This is contrast amplification of odd rows. To determine threshold M_o, observers viewed gratings of 1.2, 2 & 2.5 c/deg; +-45, 22.5, and 11.3 deg slant; temporal durations from 50 to 250ms; and values of M_e ranging from M_t to 16 M_t. **Results**. Contrast amplification, $M_t/M_o > 1$, was found at all spatial frequencies and temporal durations. Amplification increased as M_e increased to 4-8 times M_t, then decreased, becoming less than 1 for large M_e (presumably because large M_e activates contrast gain-control). Typical maximum amplification for a particular grating type was a factor of 5 with a high of 9. **Conclusions**. As in motion-direction discrimination, contrast amplification can be readily observed in slant discrimination, suggesting similar neural computations in both domains. [1]Adelson, E. H. & Bergen, J.K. (1985). *J. Opt. Soc. Amer*. A, 2:284-299. [2]Granlund, G. H., & Knutsson, H. (1983). In Braddick, O. J., & Sleigh, A. C. (Eds.) Physical and Biological Processing of Images. N.Y.: Springer, 282-303. [3]Lu, Z. L., & Sperling, G. (1999). *Invest Ophthal Vis Sci* 40, S199.