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# Distortion of Space and Time during Saccadic Eye Movements

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## ABSTRACT

The space-time distortion perceived subjectively during saccadic eye movements is an associative phenomenon of a transient shift of observer ' s visual frame of reference from one position to another. Here we report that the lines of subjective simultaneity defined as two spatially separated flashes perceived during saccades were nearly uniformly tilted along the physical time-course. The causality of the resulting space-time compression may be explained by the Minkowski space-time diagram in physics.

## KEYWORDS

Saccade Space Time Compression

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## References

[1] M. Lappe, H. Awater and B. Krekelberg, "Postsaccadic visual references generate presaccadic compression of space," Nature 403, pp. 892–895, 2000.

[2] J. Ross, M. C. Morrone, and D. C. Burr, "Compression of visual space before saccades," Nature 384, pp. 598–601, 1997.

[3] M. C. Morrone, J. Ross, and D. C. Burr, "Saccadic eye movements cause compression of time as well as space," Nature Neuroscience 8, pp. 950–954, 2005.

[4] J. R. Duhamel, C. L. Colby, and M. E. Goldberg, "The updating of the representation of visual space in parietal cortex by intended eye movements," Science 255, pp. 90–92, 1992.

[5] M. Kusunoki and M. E. Goldberg, "The time course of perisaccadic receptive field shifts in the lateral intraparietal area of the monkey," Journal of Neurophysiology 89, pp. 1519–1527, 2003.

[6] M. M. Umeno and M. E. Goldberg, "Spatial processing in the monkey frontal eye field. I. Predictive visual responses," Journal of Neurophysiology 78, pp. 1373–1383, 1997.

[7] M. C. Morrone, J. Ross, and D. C. Burr, "Keeping vision stable: rapid updating of spatiotopic receptive fields may cause relativistic-like effects," In R. Nijhawan (Ed.), Space and time in perception and action, Cambridge: Cambridge University Press, 2008.

[8] D. M. Eagleman, "Distortion of time during rapid eye movements," Nature Neuroscience 8, pp. 850–851, 2003.

[9] A. Einstein, "Relativity: The Special and General Theory," New York: Henry Holt, 1920.

[10] B. Libet, E. W. J. Wright, B. Feinstein, and D. K. Pearl, "Subjective referral of the timing for a conscious sensory experience: a functional role for the somatosensory specific projection system in man," Brain 102, pp. 193–224, 1979.

[11] K. Yarrow, P. Haggard, R. Heal, P. Brown, and J. C. Rothwell, "Illusory perceptions of space and time

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preserve cross-saccadic perceptual continuity, " Nature 414, pp. 302 – 305, 2001.

[12] M. R. Diamond, J. Ross, and M. C. Morrone, " Extraretinal control of saccadic suppression, " Journal of Neuroscience 20, pp. 3442 – 3448, 2000.

[13] M. C. Morrone, J. Ross, and D. C. Burr, " Apparent position of visual targets during real and simulated saccadic eye movements, " Journal of Neuroscience 17, pp. 7941 – 7953, 1997.