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Eye-Target Synchrony and Attention R. CONTRERAS, Dept. of Physics and Astronomy and Center for Neurodynamics, Univ. of Missouri - St. Louis (UMSL), R. KOLSTER, Brain Trauma Foundation and Weill Medical College of Cornell, Sackler Institute, Dept. of Psychiatry, S. BASU, Brain Trauma Foundation, H. U. VOSS, Weill Medical College of Cornell, Radiology, J. GHAJAR, M. SUH, Brain Trauma Foundation and Weill Medical College of Cornell, Neurological Surgery, S. BAHAR, Dept. of Physics and Astronomy and Center for Neurodynamics, UMSL — Eye-target synchrony is critical during smooth pursuit. We apply stochastic phase synchronization to human pursuit of a moving target, in both normal and mild traumatic brain injured (TBI) subjects. Smooth pursuit utilizes the same neural networks used by attention. To test whether smooth pursuit is modulated by attention, subjects tracked a target while loaded with tasks involving working memory. Preliminary results suggest that additional cognitive load increases normal subjects' performance, while the effect is reversed in TBI patients. We correlate these results with eye-target synchrony. Additionally, we correlate eye-target synchrony with frequency of target motion, and discuss how the range of frequencies for optimal synchrony depends on the shift from attentional to automatic-response time scales. Synchrony deficits in TBI patients can be correlated with specific regions of brain damage imaged with diffusion tensor imaging (DTI).

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