

11-th International Conference
«INTELLIGENT DATA PROCESSING: THEORY and APPLICATIONS»

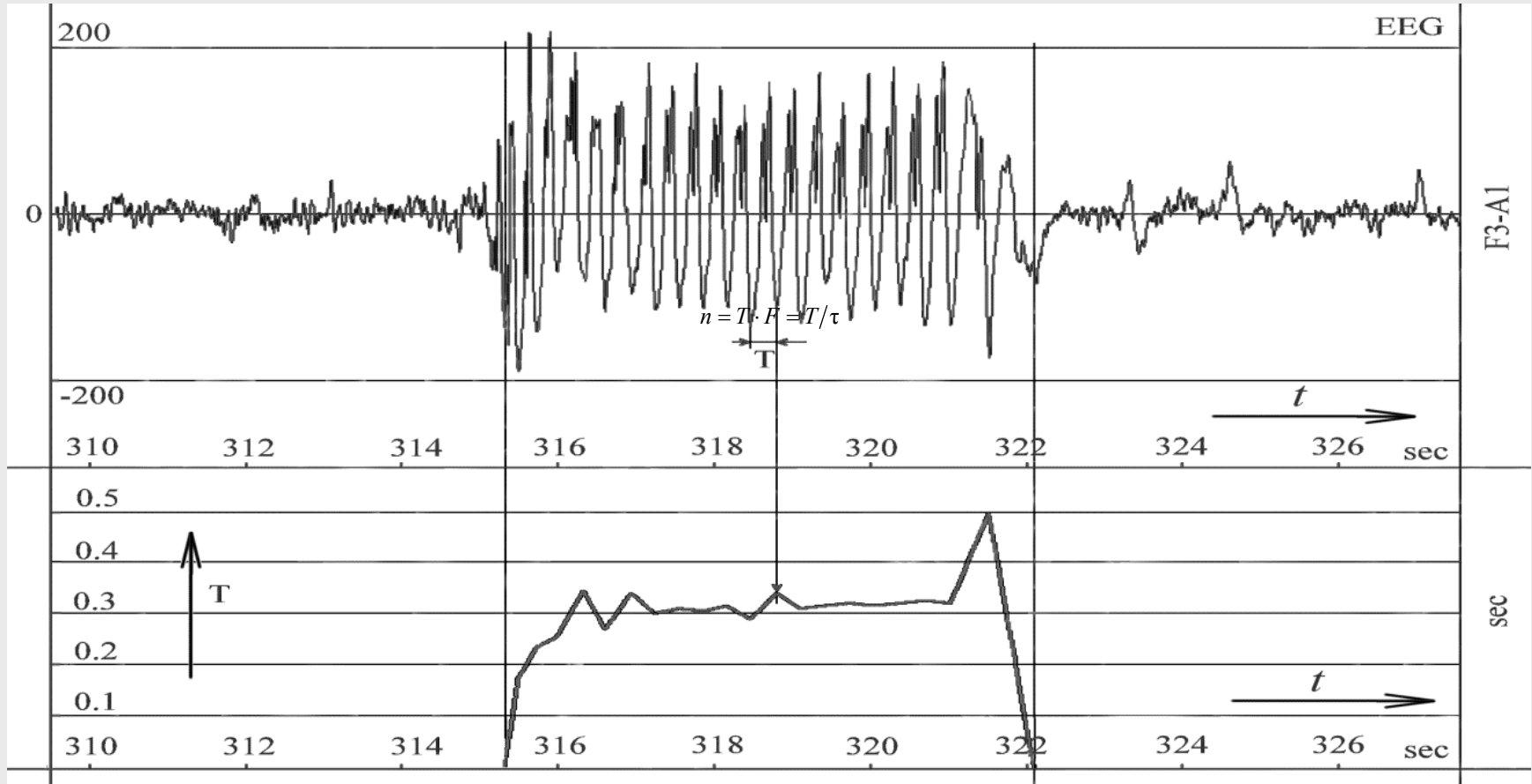
Antsiperov Viacheslav, Obukhov Yury

**Analysis of brain structures hypersynchronization
during the epileptic discharges on the basis of
conical kernel representations of
electroencephalogram signal**

Moscow, Kotel'nikov IRE RAS,
Dolgoprndny, MIPT

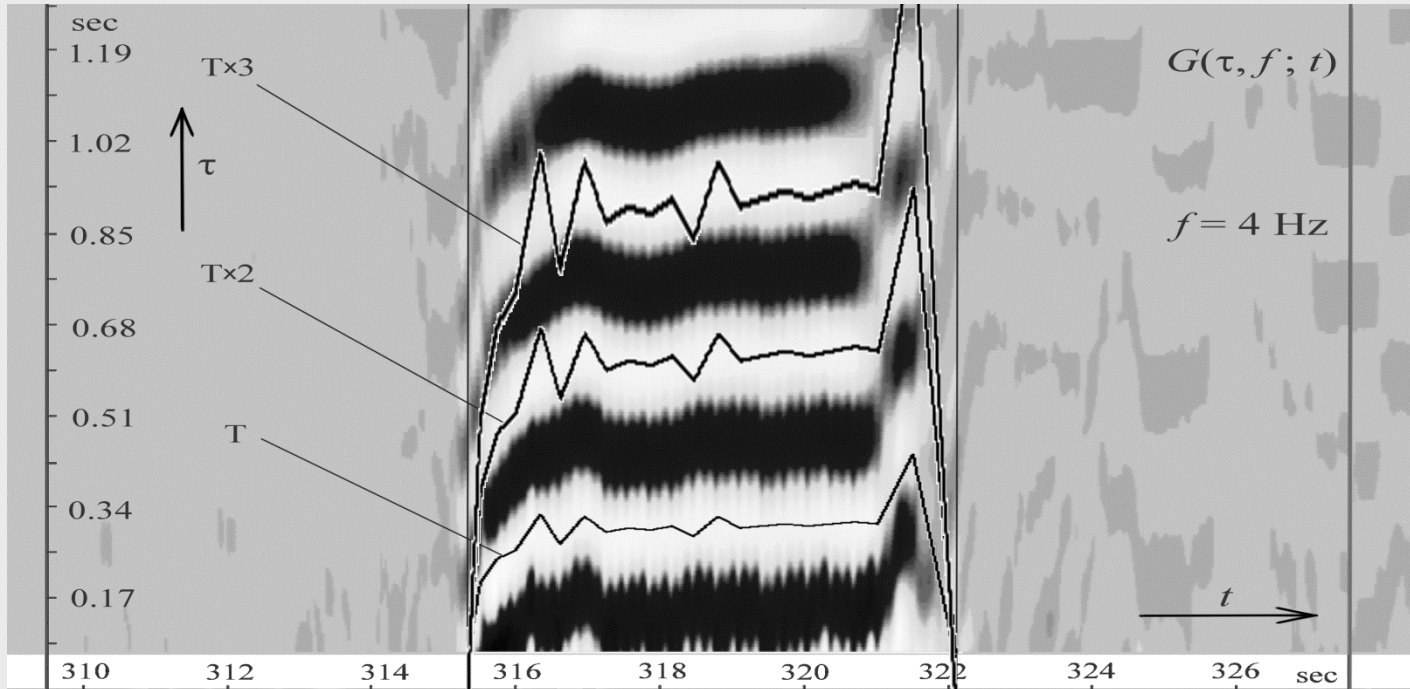
Moscow, Russia - Barcelona, Spain
10-14 october 2016 г.

Nonstationarity of epileptic seizures: high frequency stability over a short time intervals :



Typical epileptic seizure: $n = \tau \cdot F = \tau / T \approx 10$

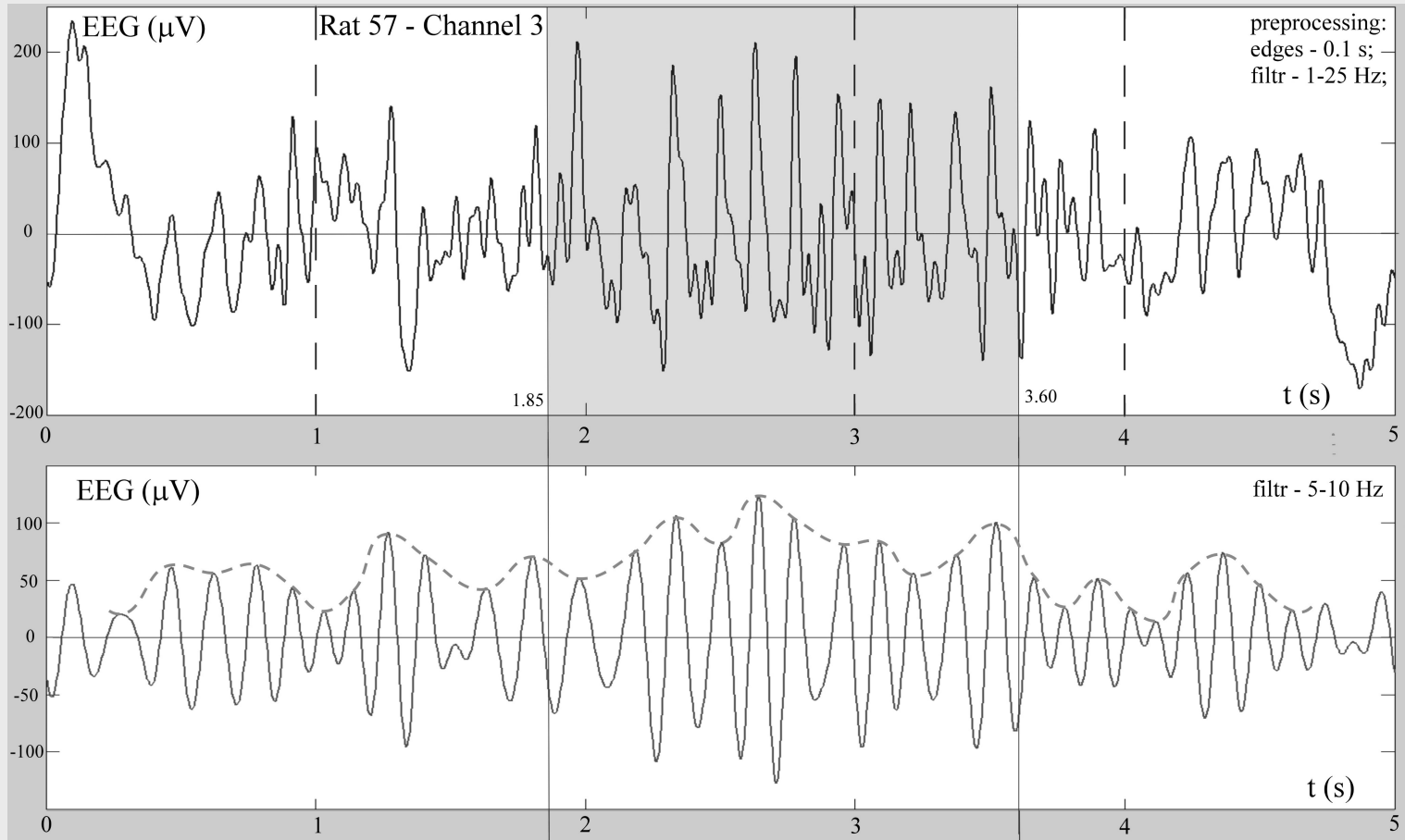
Cone Kernel Representation (CKR) of epileptic seizure



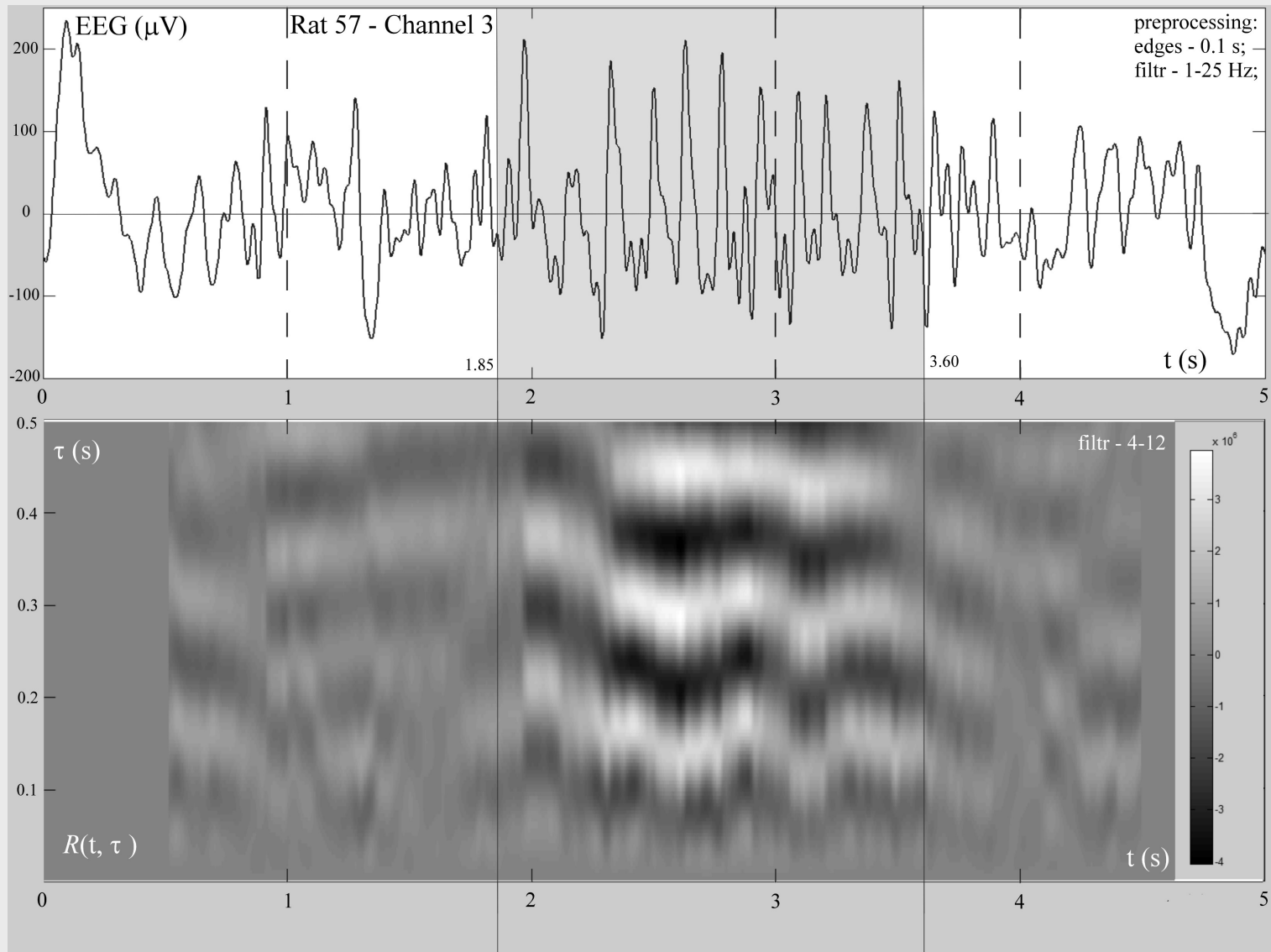
$$G(\tau, f; t) = \int_{-\infty}^{\infty} w(\tau' - \tau) \hat{R}(\tau', t) \exp(-2\pi i f (\tau' - \tau)) d\tau'$$

$$\hat{R}(\tau) = \frac{1}{\tau} \int_{-\tau/2}^{\tau/2} y(t - \tau/2) y(t + \tau/2) dt$$

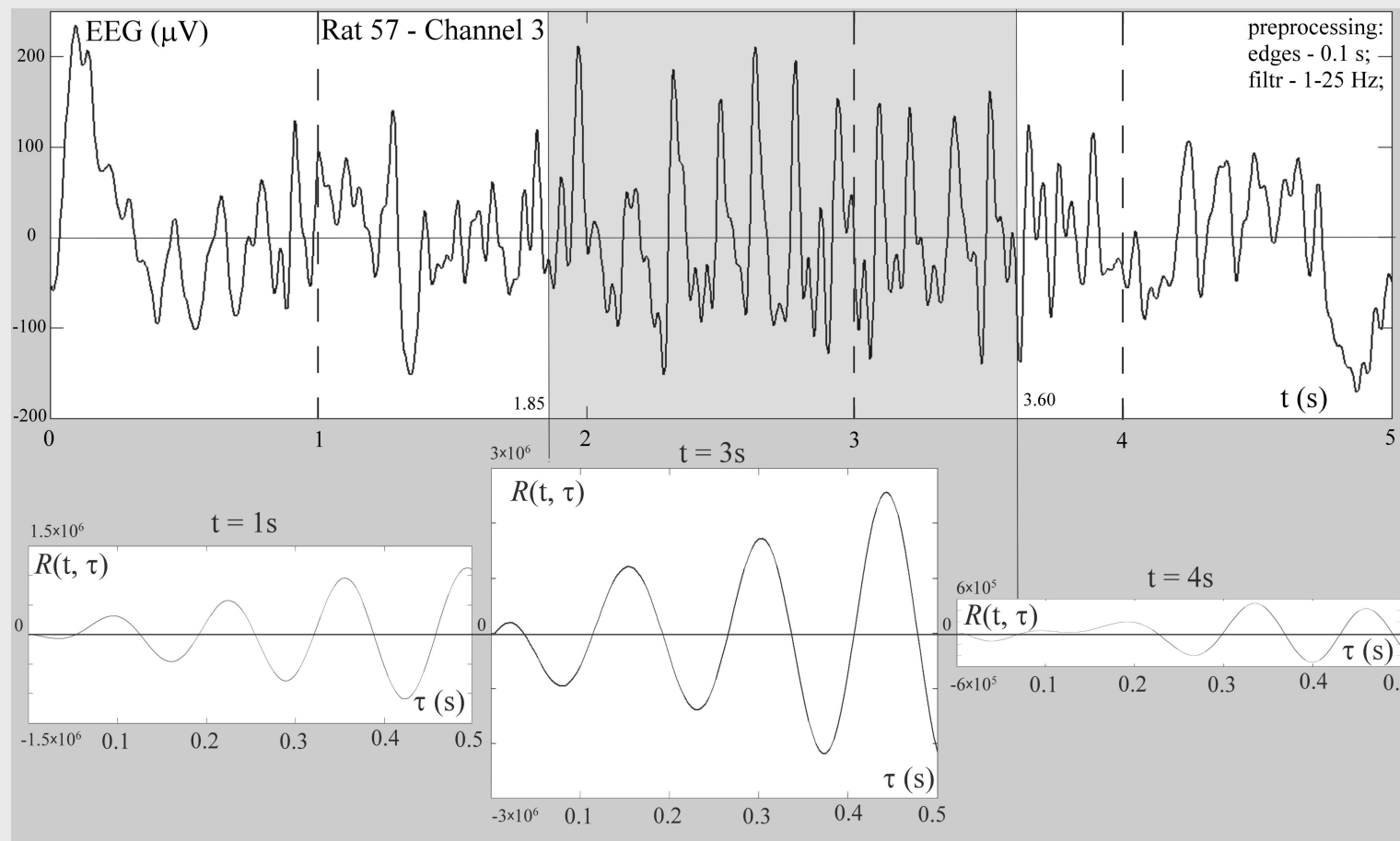
Output of linear filtering rat epileptic seizure:



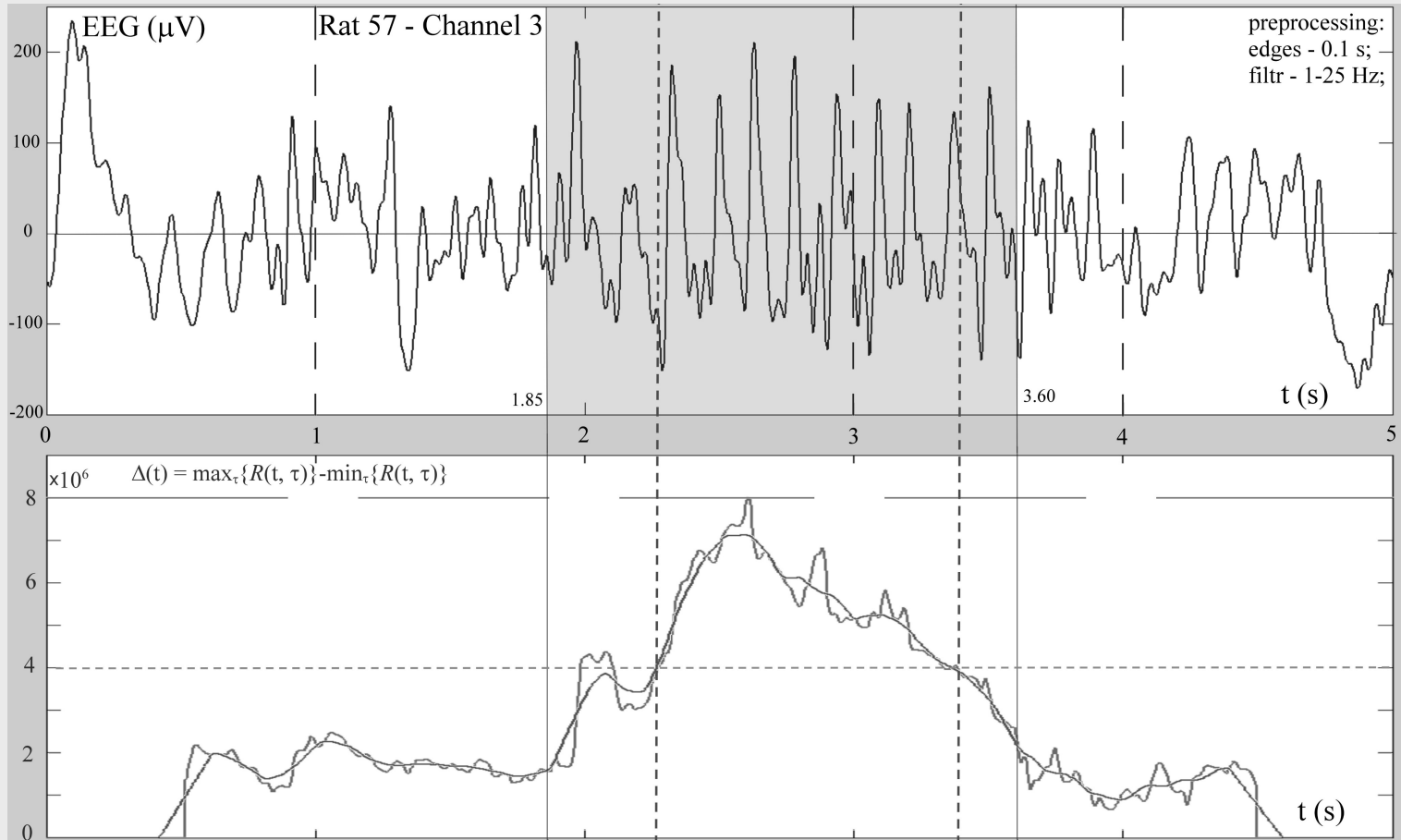
Cone Kernel Representation of rat epileptic seizure:



Time cross sections of rat epileptic seizure CKR:

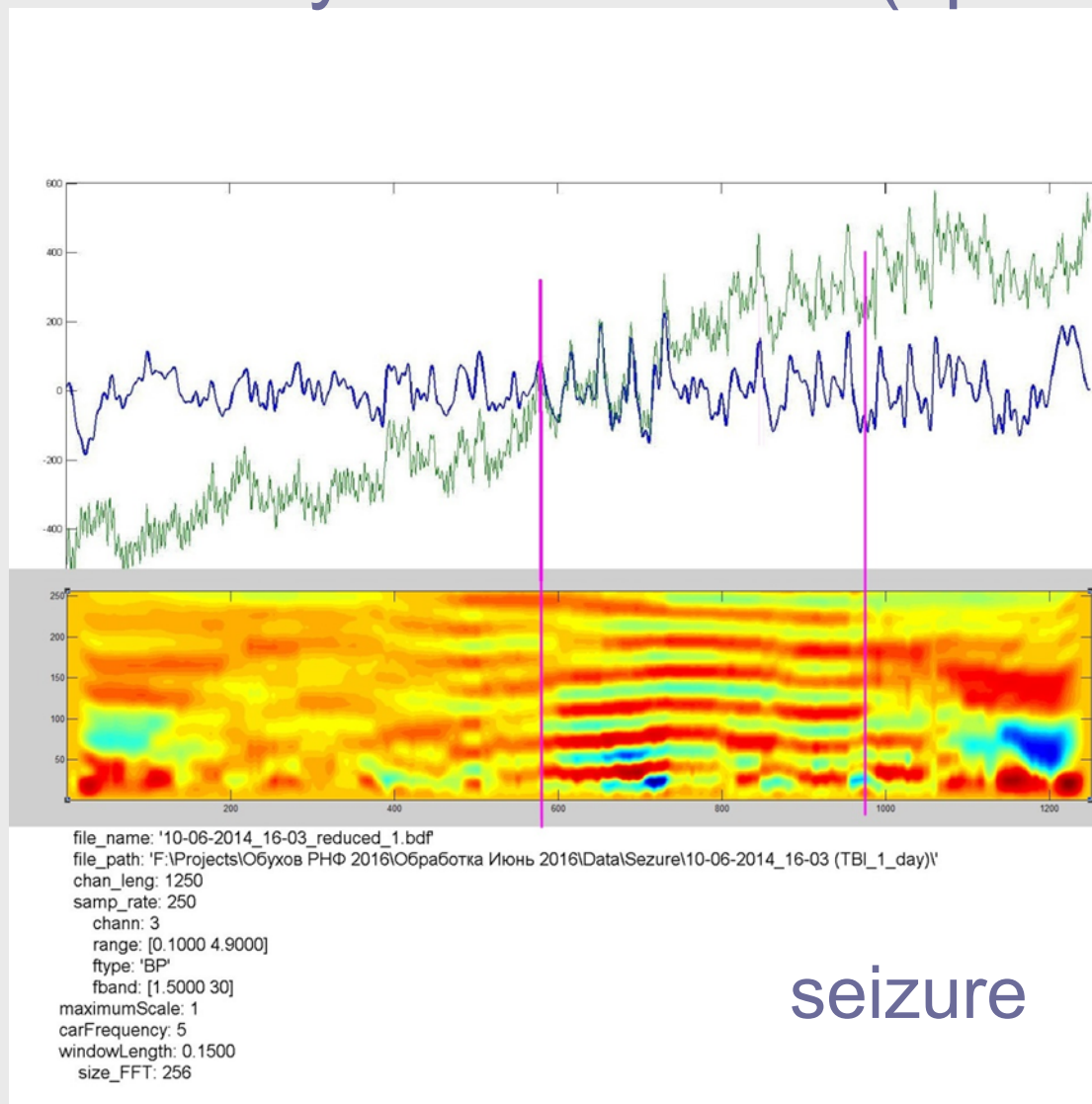


Hypersynchronization parameter of rat epileptic seizure :

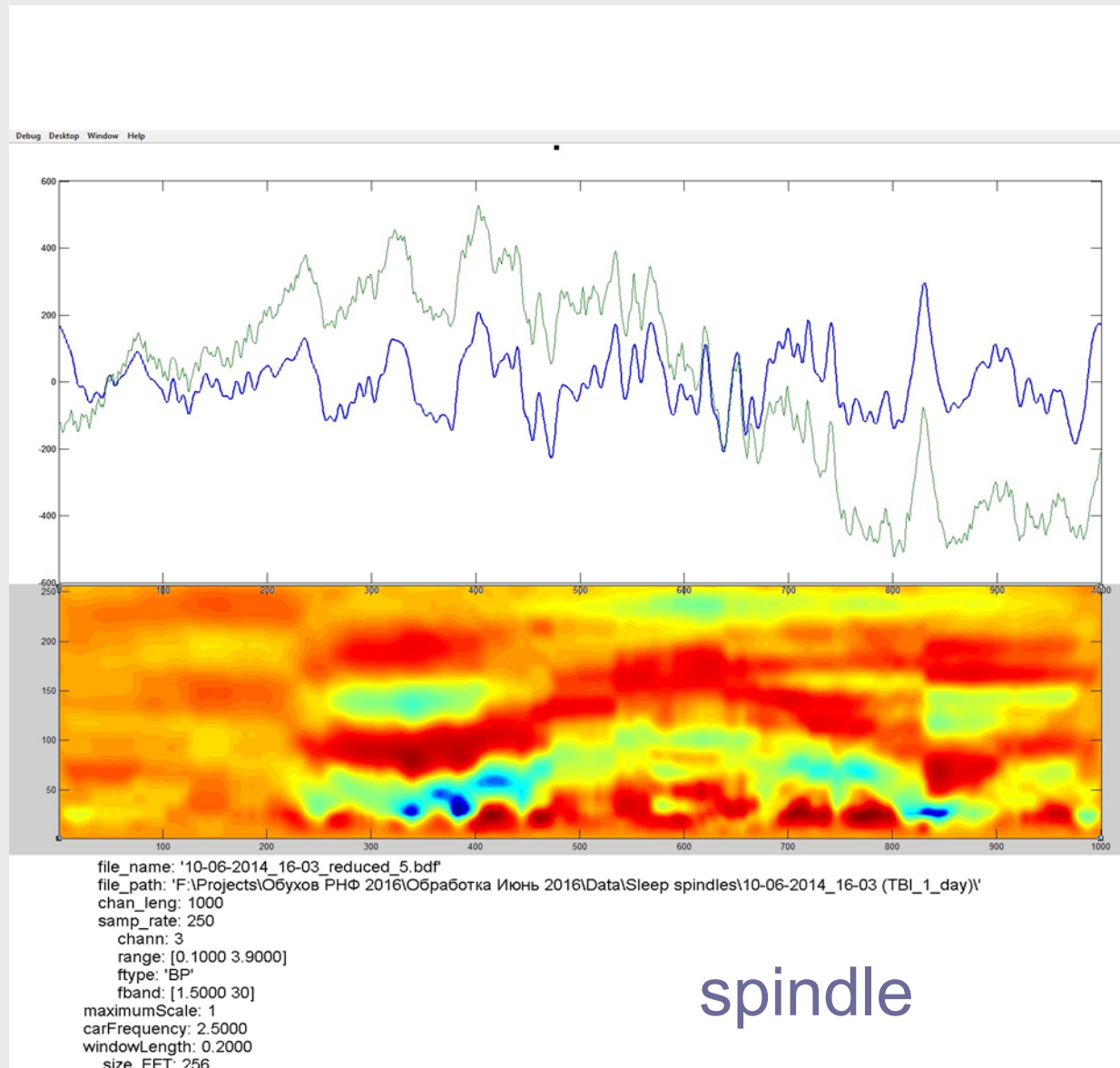


$$\mu(t) = G(T, f; t) = \max_{\tau} G(\tau, f; t)$$

Discrimination epileptic seizure from the spontaneous synchronization (spindle) I



Discrimination epileptic seizure from the spontaneous synchronization (spindle) II





Thank you
for your
attention