

Report on VI International Congress Weak and Super Weak Fields and Radiations in Biology and Medicine, St. Petersburg. Russia, July 2-6, 2012



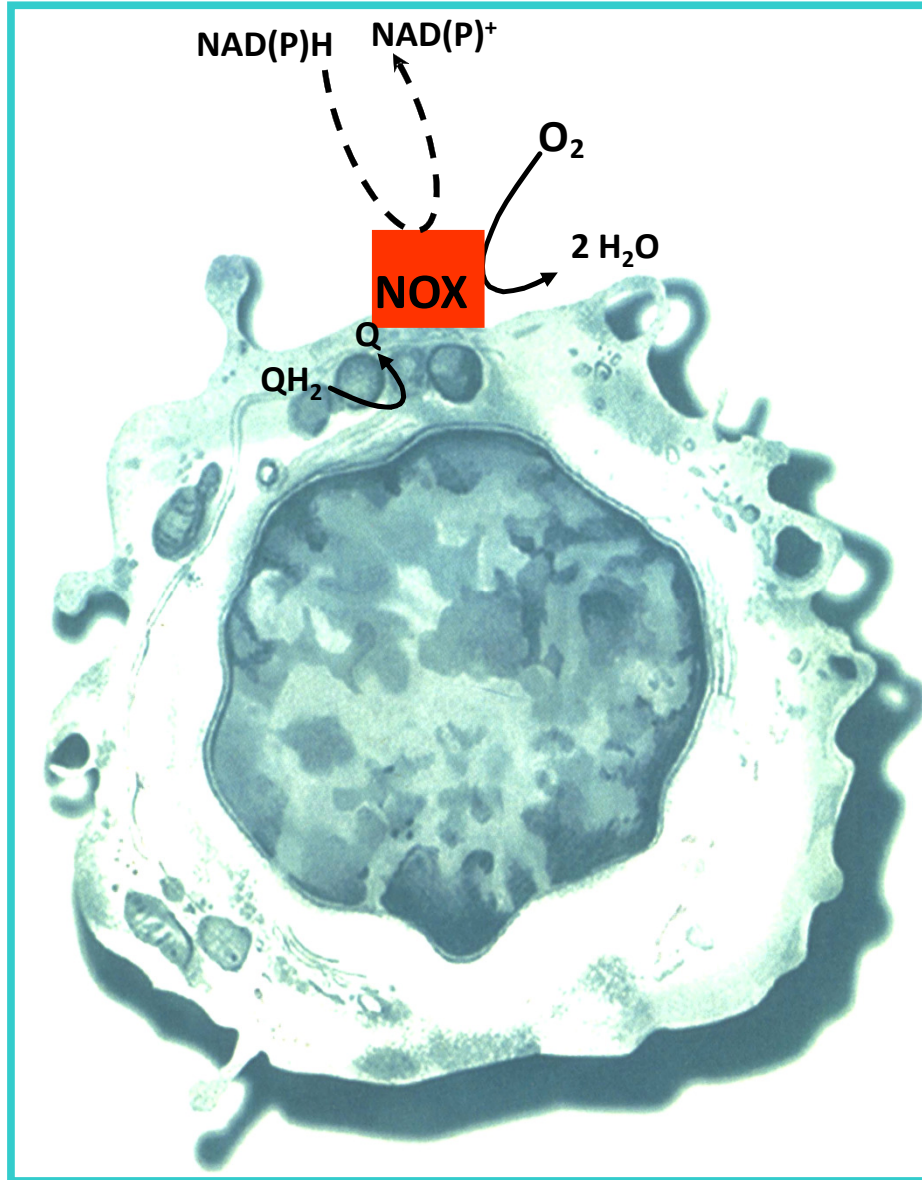
VI Международный конгресс
International Congress

«СЛАБЫЕ И СВЕРХСЛАБЫЕ ПОЛЯ И
ИЗЛУЧЕНИЯ В БИОЛОГИИ И МЕДИЦИНЕ»

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Научная программа
Sci Program

«LOW AND SUPERLOW FIELDS AND
RADIATIONS IN BIOLOGY AND MEDICINE»

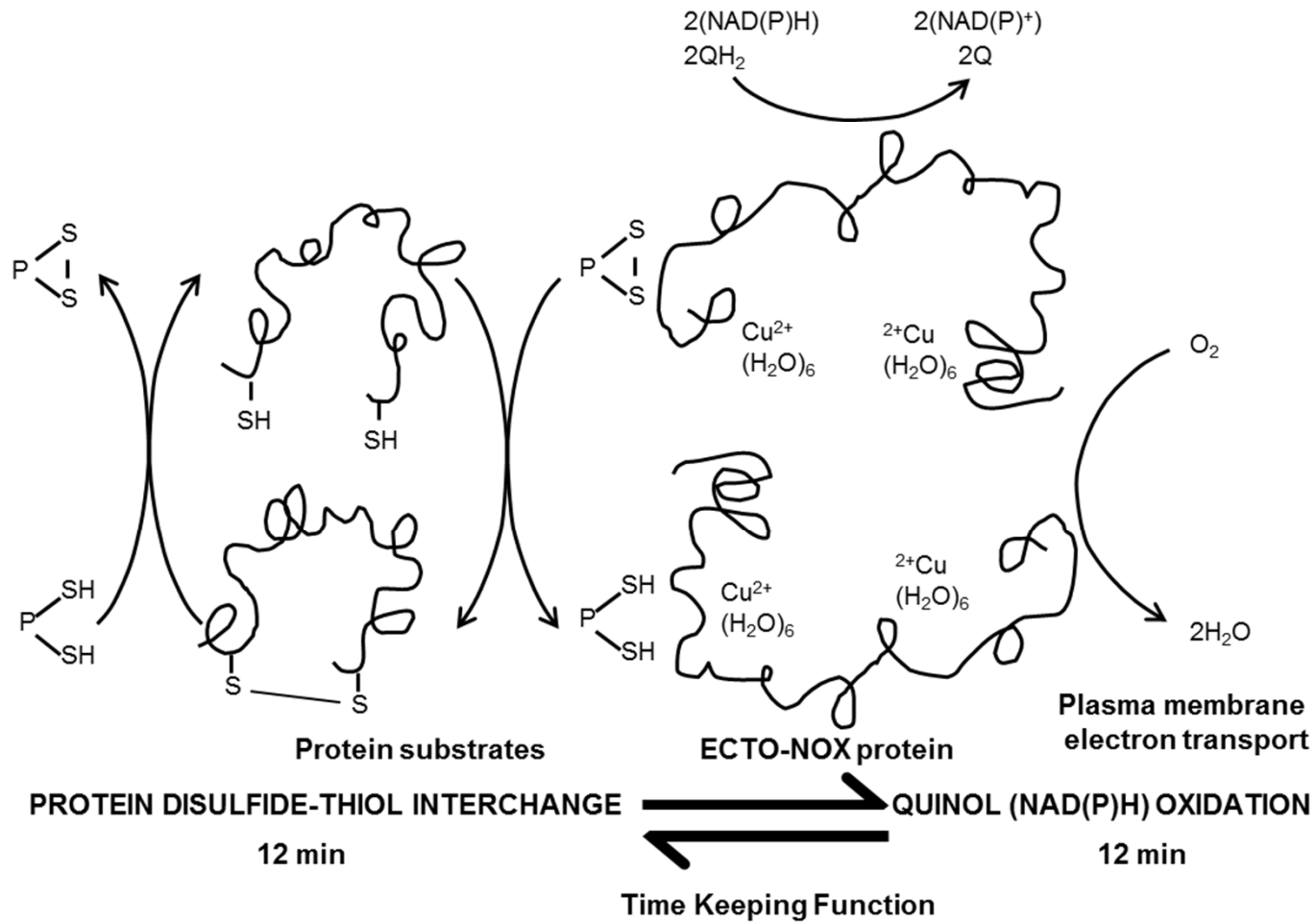


ECTO-NOX PROTEINS LOCATED ON EXTERNAL SURFACE OF THE PLASMA MEMBRANE

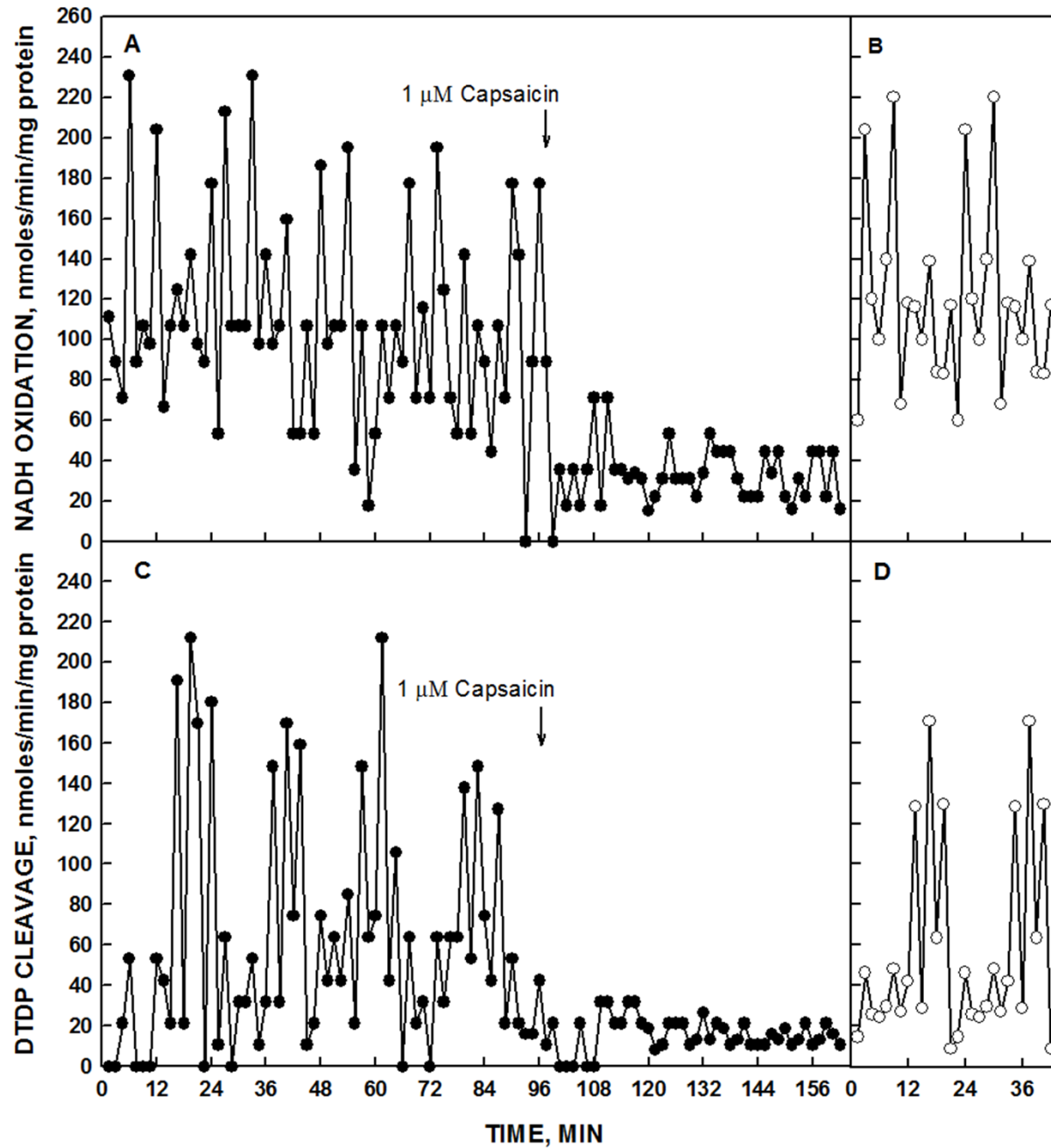
- **Oxidize NADH (non-physiological substrate)**
- **Oxidize plasma membrane (hydroquinones physiological substrate)**
- **Essential growth function (protein disulfide-thiol interchange)**

ECTO-NOX PROTEINS

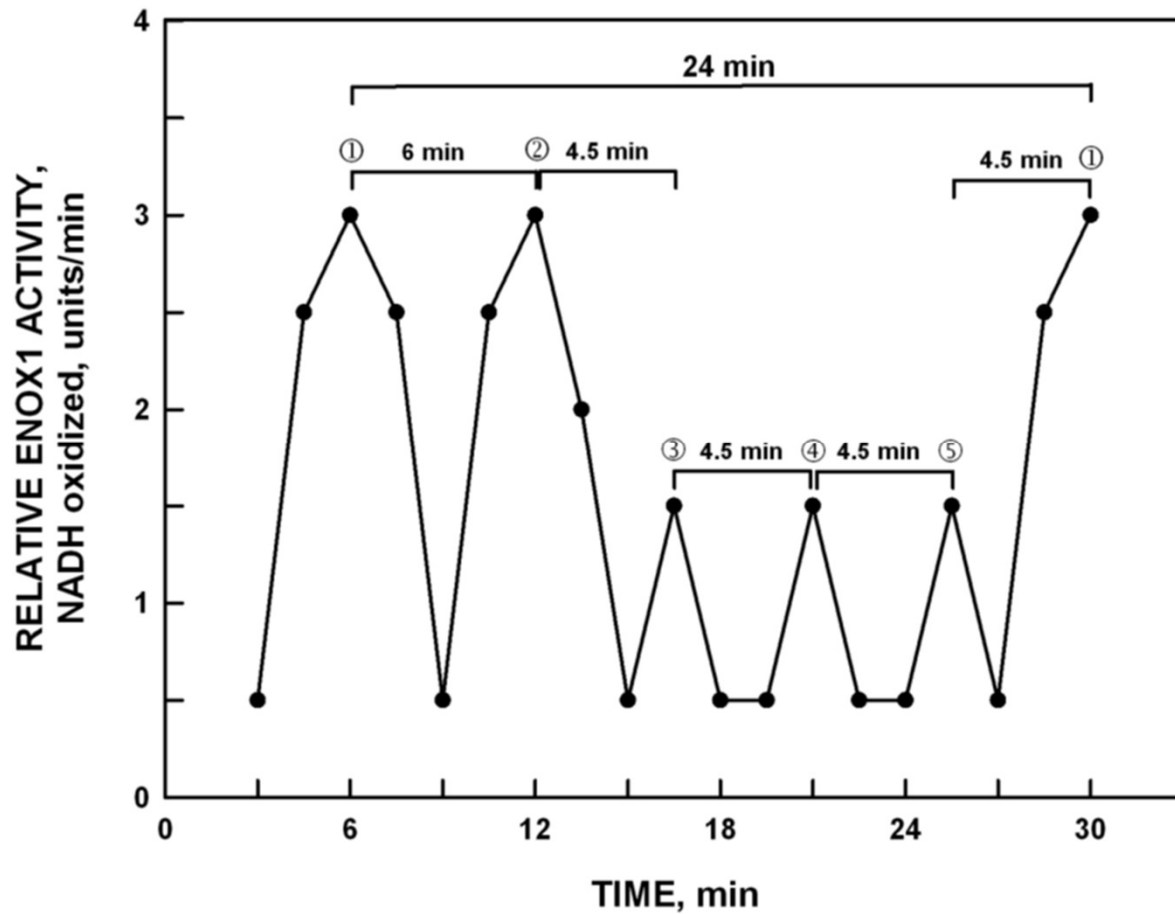
Metalocatalysts with binuclear copper centers that oscillate



2 + 3 PATTERN OF RECOMBINANT ECTO-NOX ACTIVITY OSCILLATIONS



SCHEMATIC OF ENOX CYCLE



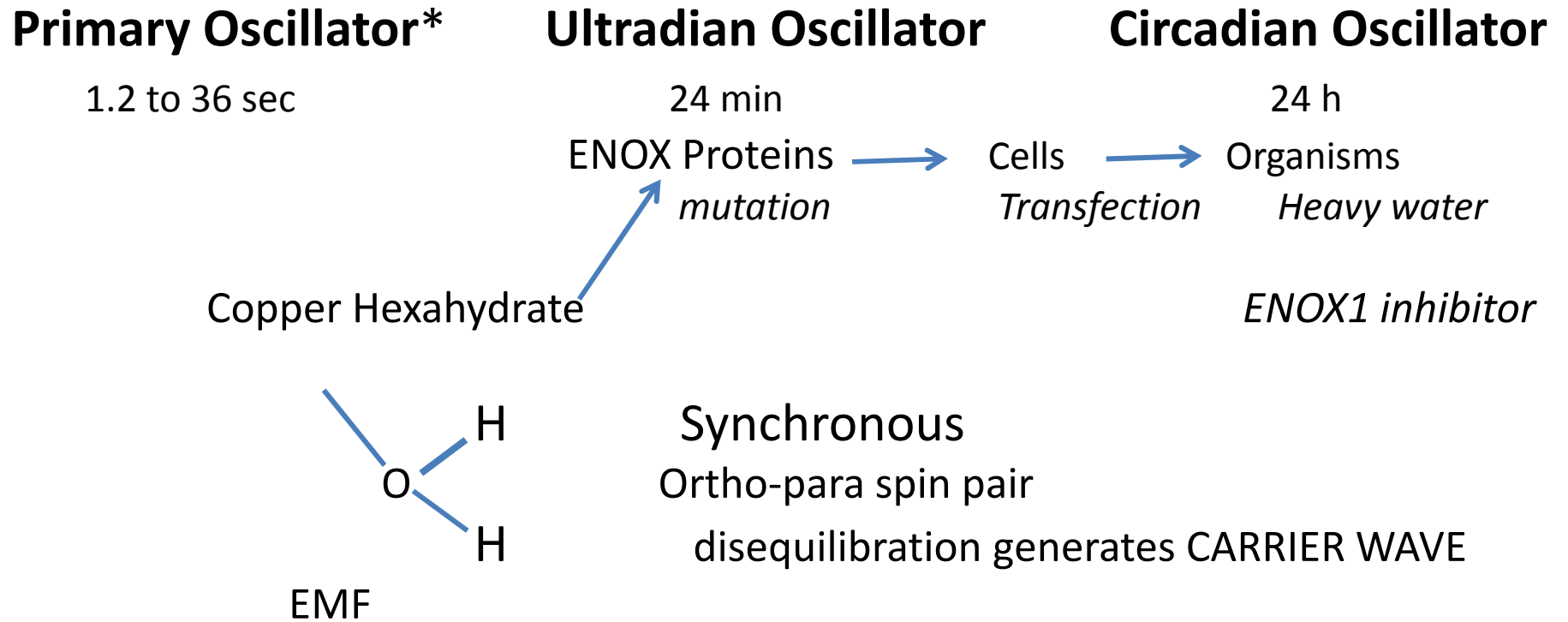
$$6 \text{ min} + (4 \times 4.5 \text{ min}) = 24 \text{ min}$$

DATA AVERAGED OVER 1 MIN EVERY 1.5 MIN

The ENOX Cycle is:

- **Autoentrainable**
- **Phased by blue light (blue and red in plants)**
- **Phased by very low frequency EMF**
- **Phased by melatonin and valerian**
- **Period length is independent of temperature**
- **Period length is increased in D₂O by 20%**

HYPOTHESIS AND EVIDENCE



*Balance of a mechanical time piece

Morré, D. J. and Morré, D.M. 2012. ECTO-NOX proteins. Springer





S. Pershin

**Wave Research Center
Prokhorov General Physics Institute
Russian Academy of Sciences
Moscow**

Presentation on

New Concept:

**The origin of superweak field interaction
with water and bioobjects**

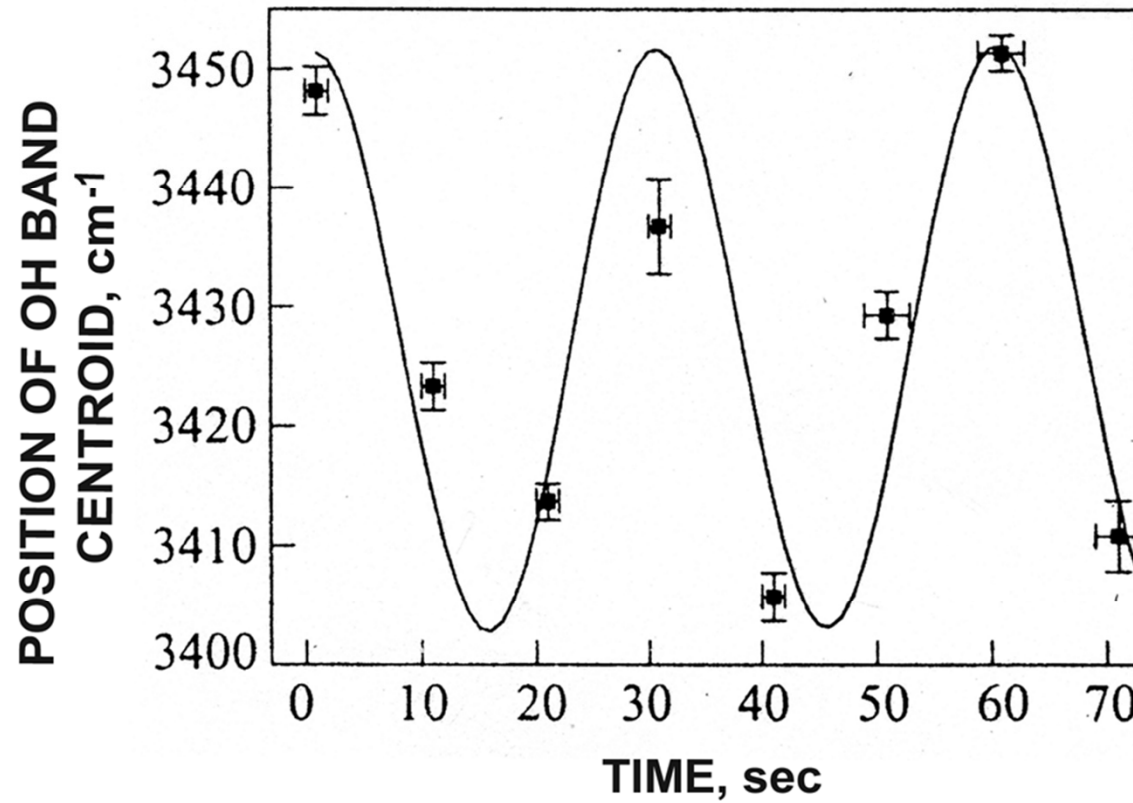
is

ortho-para H_2^O quantum differences

Principal Reference

**W. M. Pershin. *Phys. Wave Phenomena*
*17(4), 241 (2009)***

OSCILLATIONS IN ORTHO-PARA HYDROGEN SPIN RATIOS WATER BY RAMAN SPECTROSCOPY



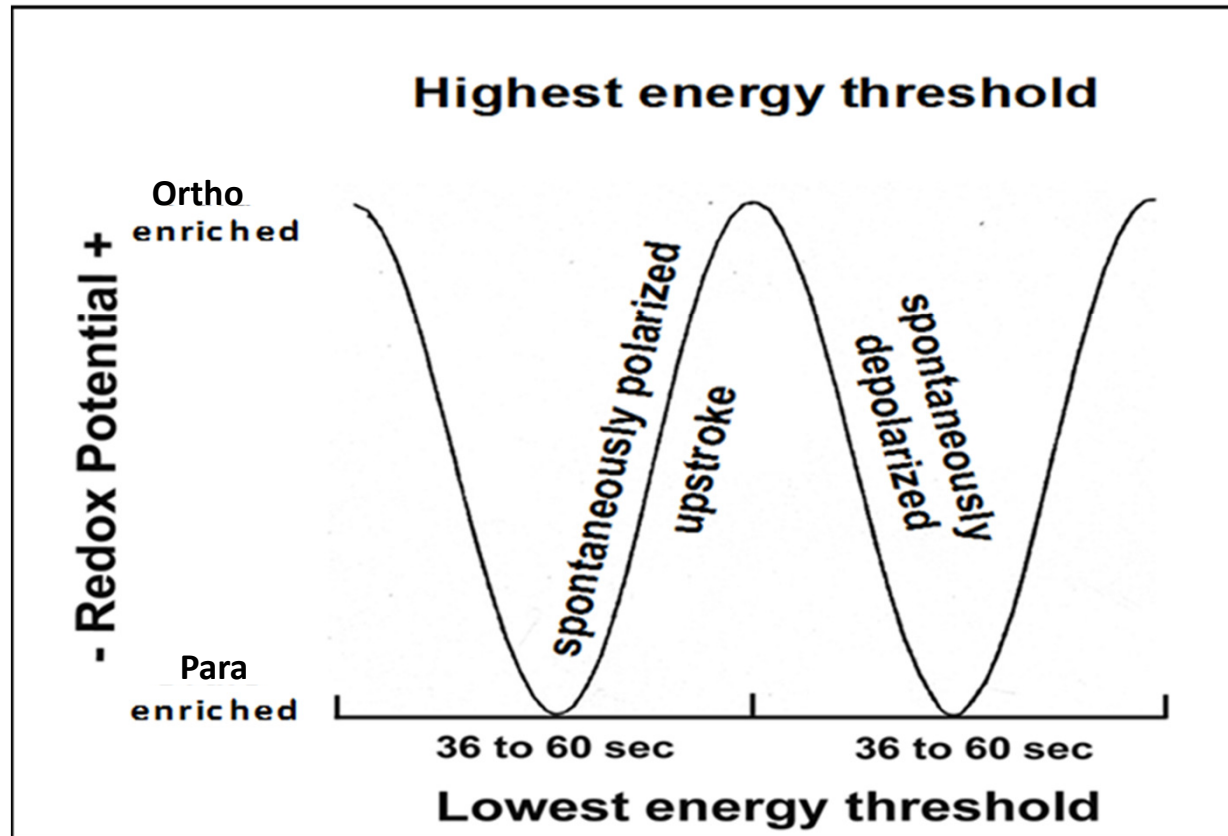
Period length 35 ± 13 seconds

From S.M. Pershin. 2005
Physics of Wave Phenomena
13:192-208

Pershin observed
Ortho-para spin-isomers H₂O in
water with non-equilibrium ratio 1:1

Pershin concluded
Water is non-equilibrium liquid and very
sensitive to any weak perturbation

MODEL BASED ON CONCEPT OF LIMIT OSCILLATIONS



Andrey Drozdov

**The Institute for Analytical Instrumentation
of the Russian Academy of Sciences
Moscow**

Presentation on

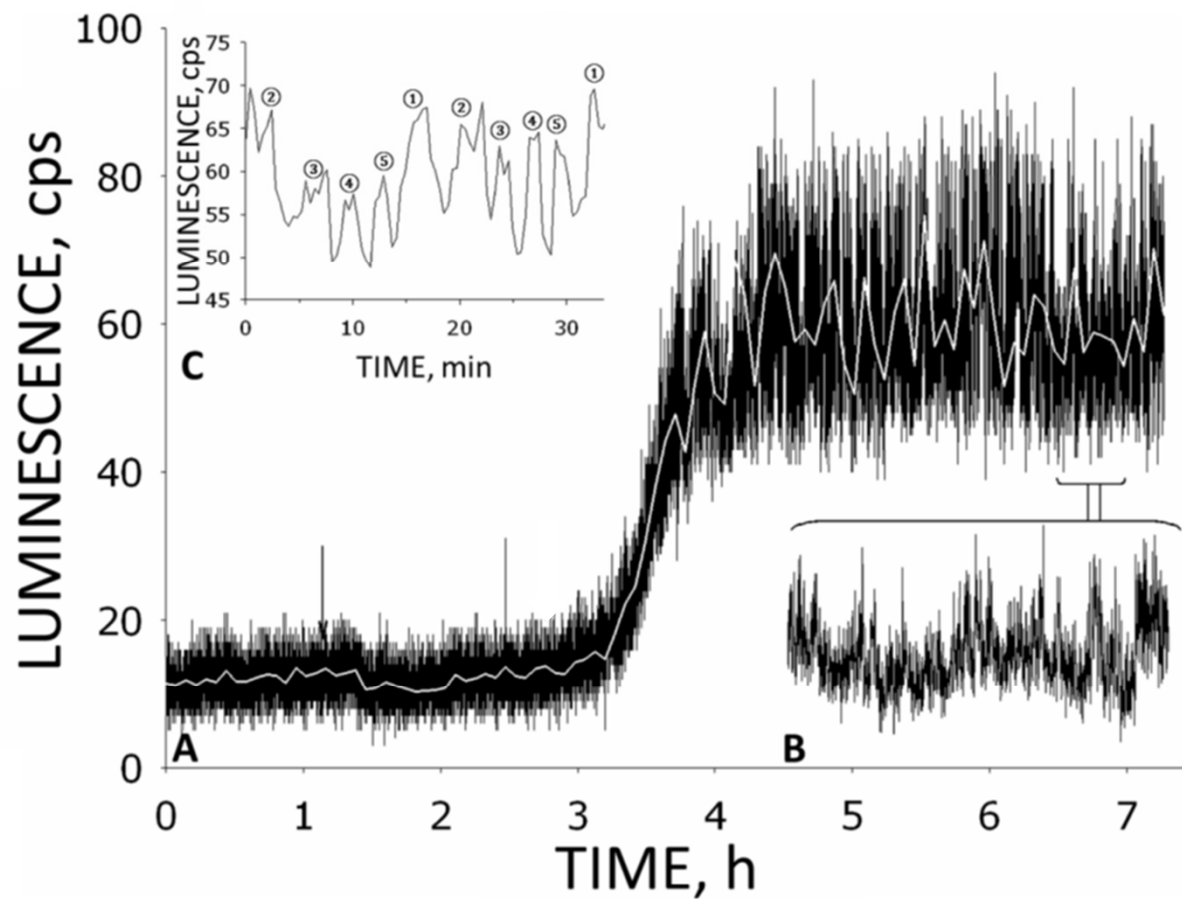
**The dynamics of intermolecular
interactions in water**

with S. Masukevich and T. Nagorskaya

Periodic structural rearrangements

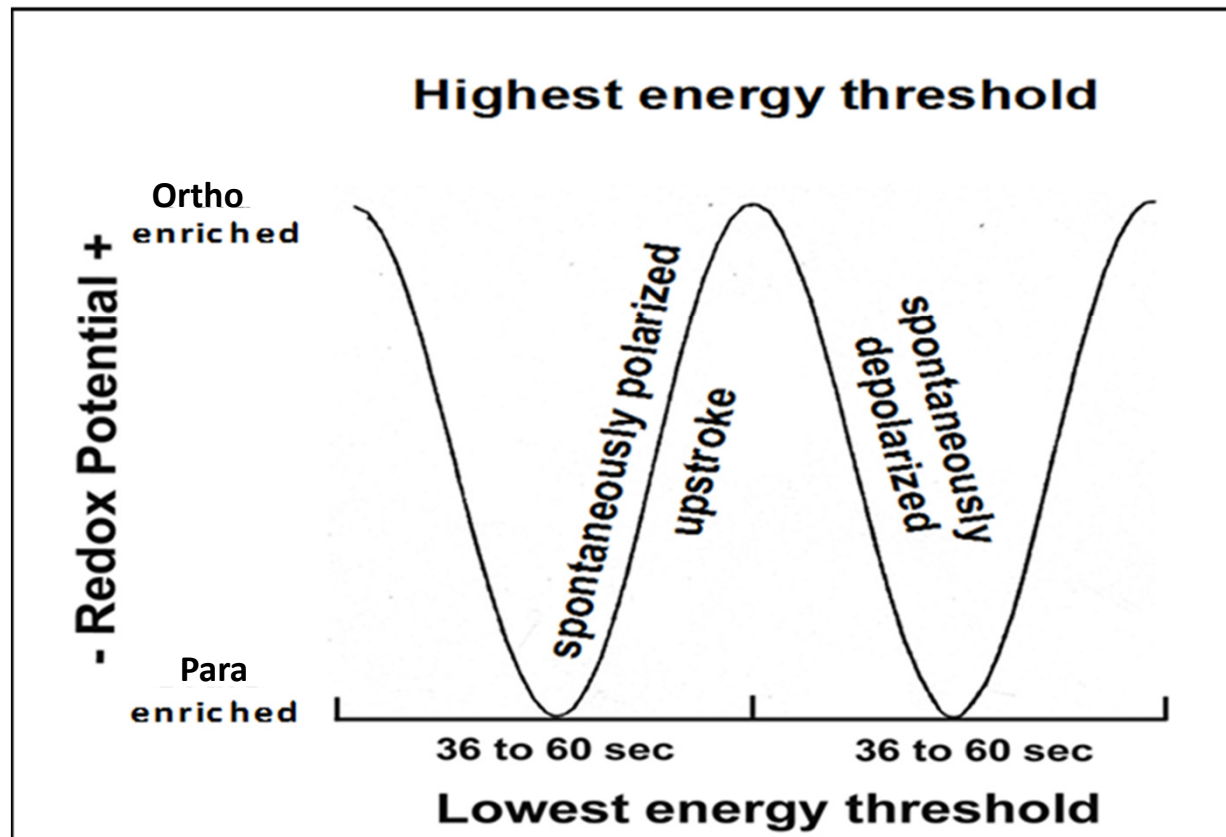


WATER LUMINESCENCE INDUCED BY LASER RADIATION

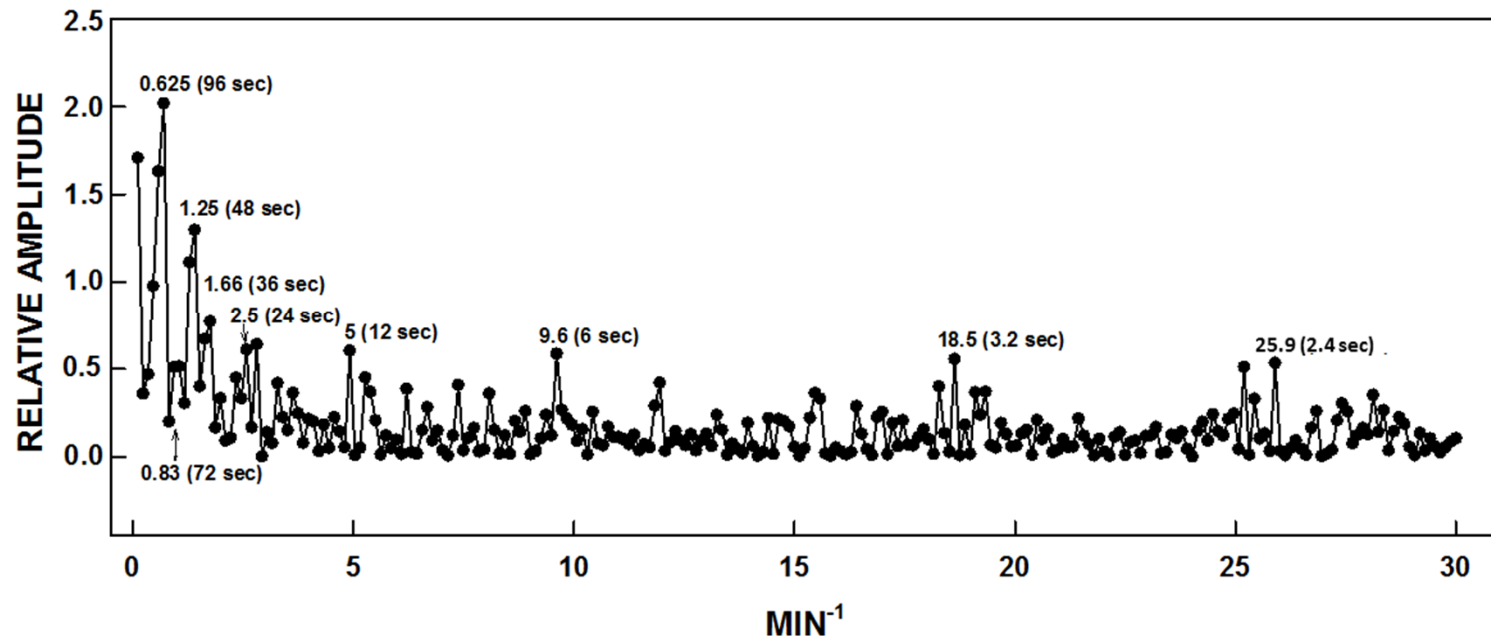


Gudkov et al., J. Phys. Chem. 115:7693-7697 (2011)

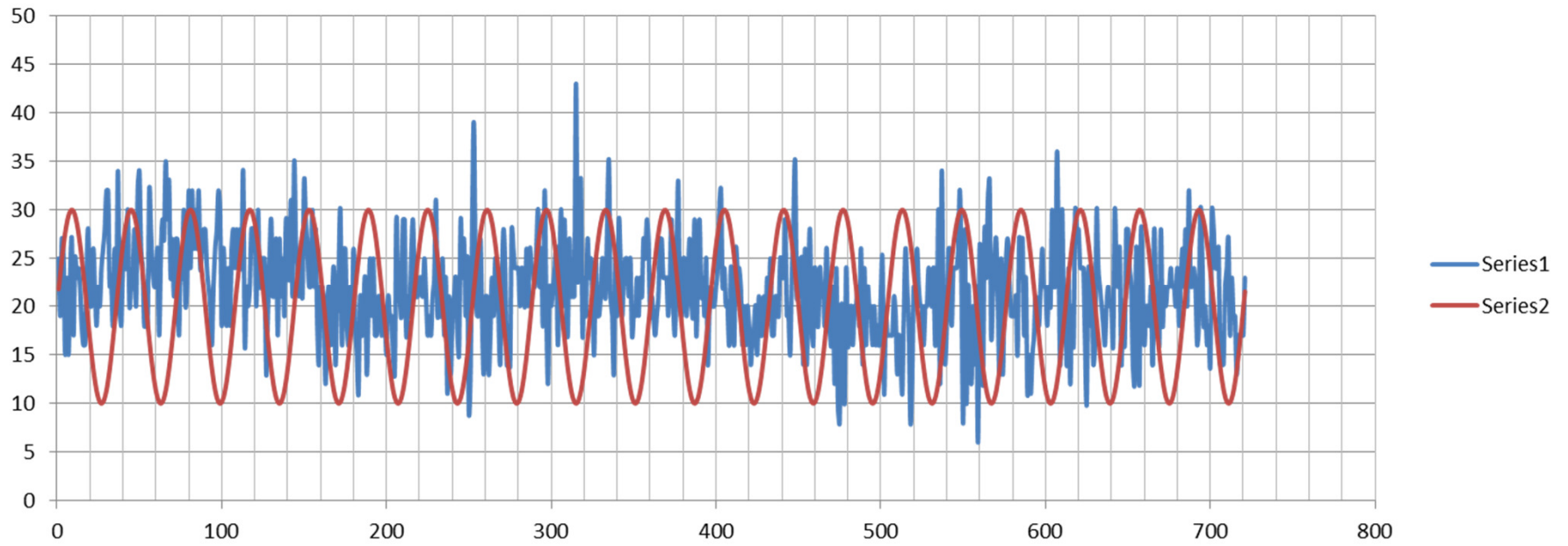
MODEL BASED ON CONCEPT OF LIMIT OSCILLATIONS



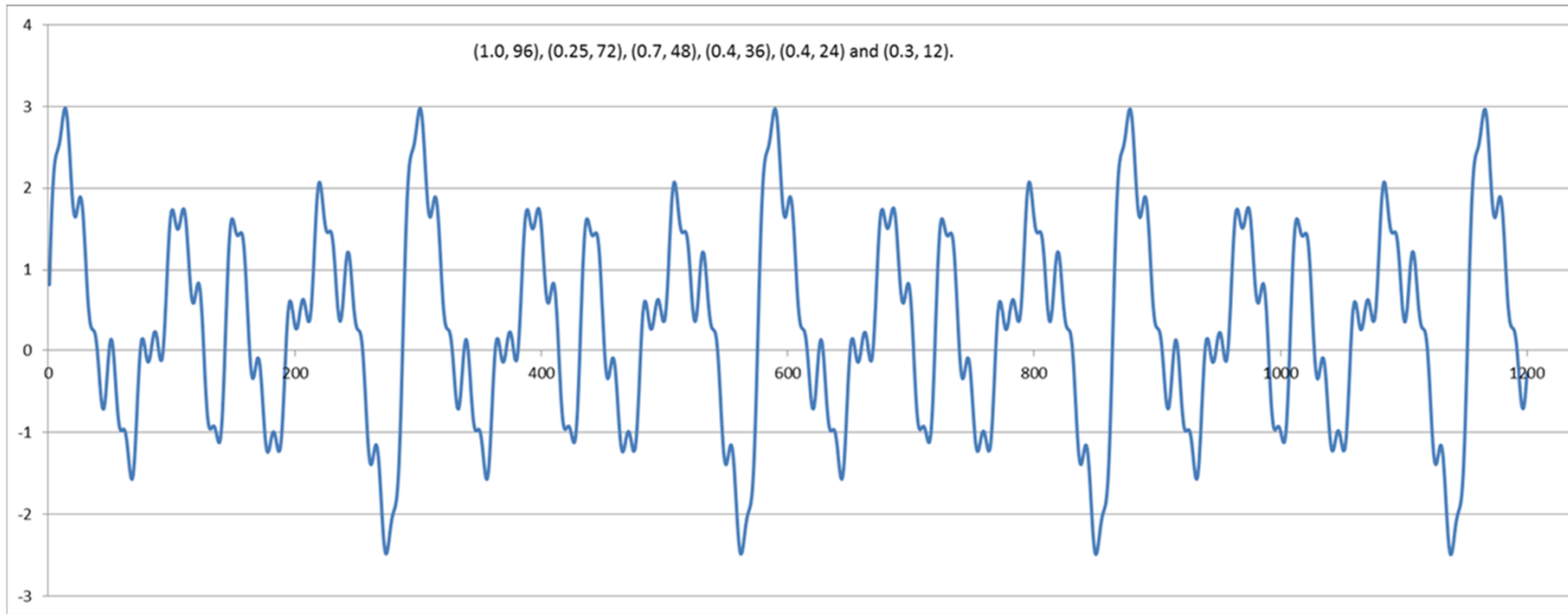
FOURIER ANALYSIS OF LUMINESCENCE DATA



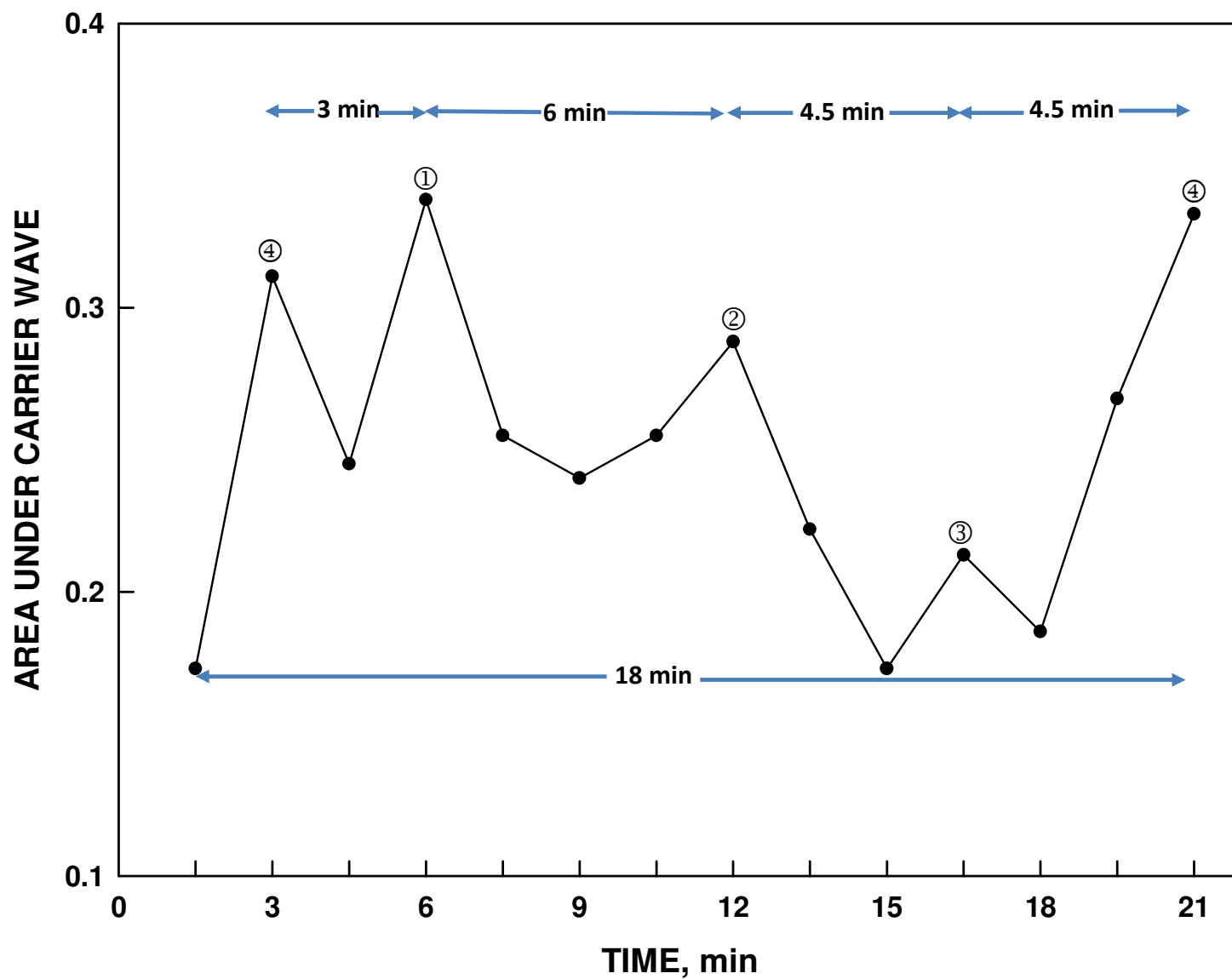
FIT TO 36 SEC PERIOD



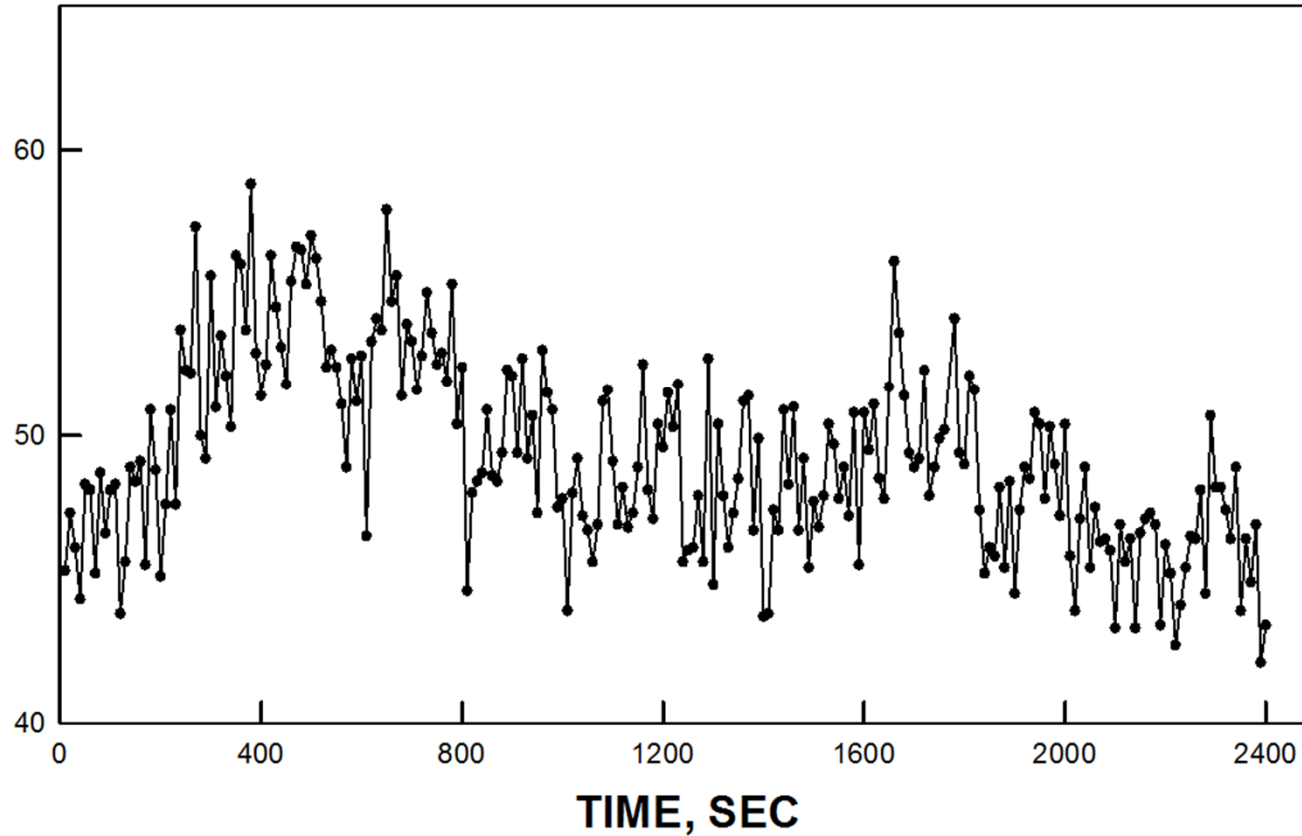
SUMMATION OF CARRIER WAVE



CARRIER WAVE ANALYZED OVER 1 MIN EVERY 1.5 MIN

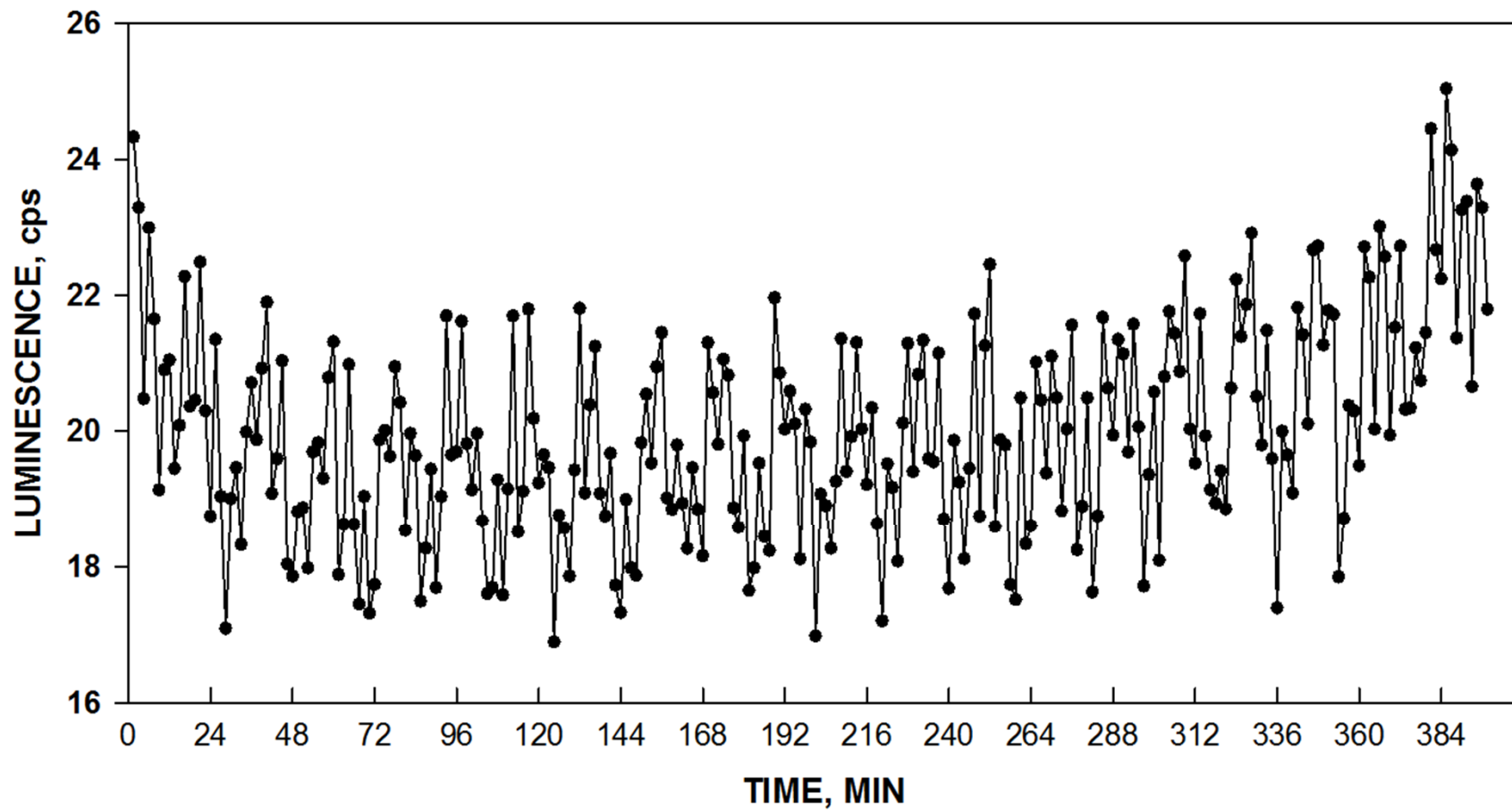


**DATA COLLECTED AT 1 SEC INTERVALS OF
PREVIOUS SLIDE AVERAGED OVER 10 SEC**

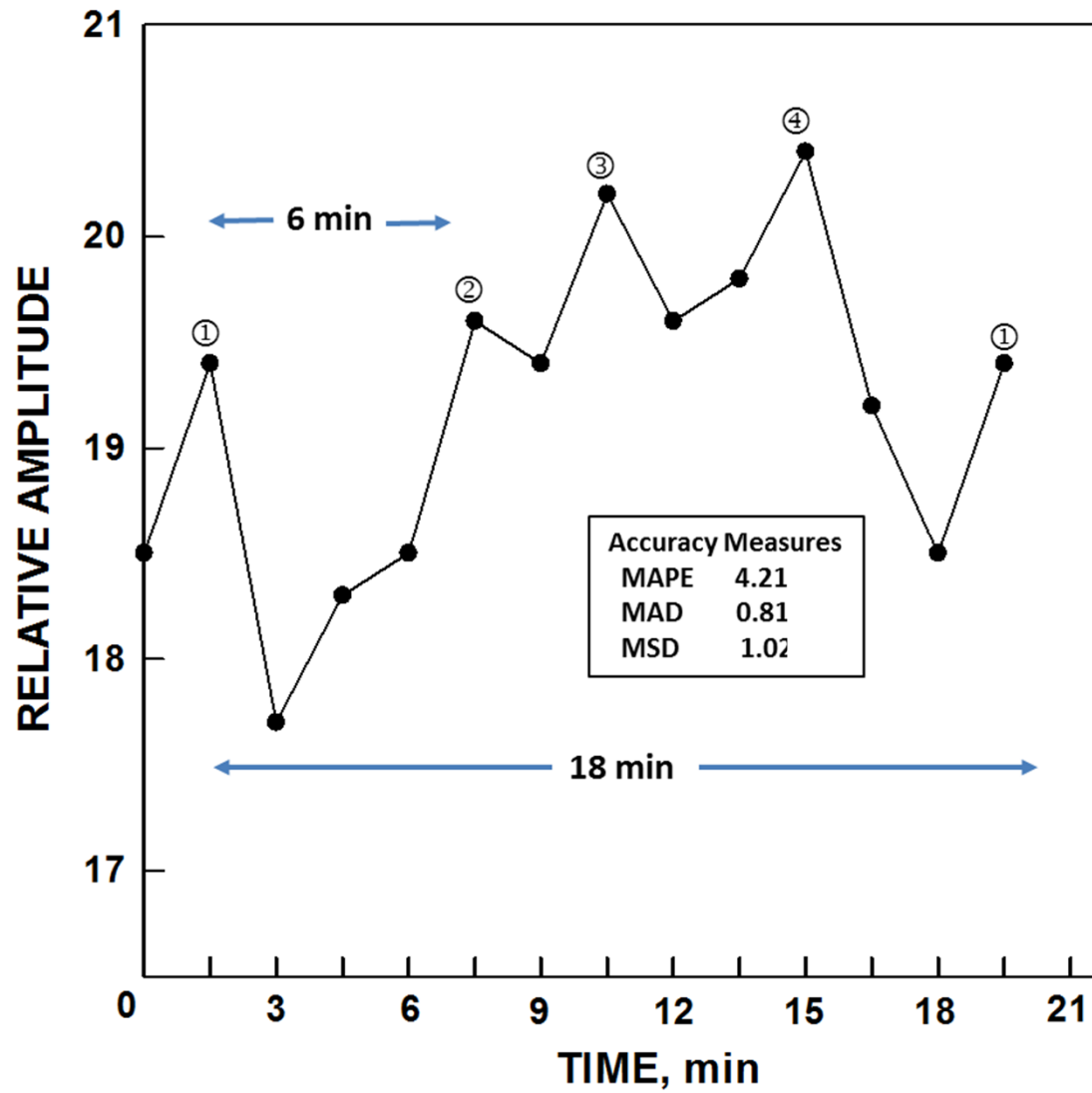


AVERAGE PERIOD LENGTH 37.5 SEC

10 SEC AVERAGES AVERAGED OVER 1 MIN EVERY 1.5 MIN



DECOMPOSITION FIT OF AVERAGED DATA





V. L. Voeikov and E. Del Giudice

Exclusion zone and coherence domains

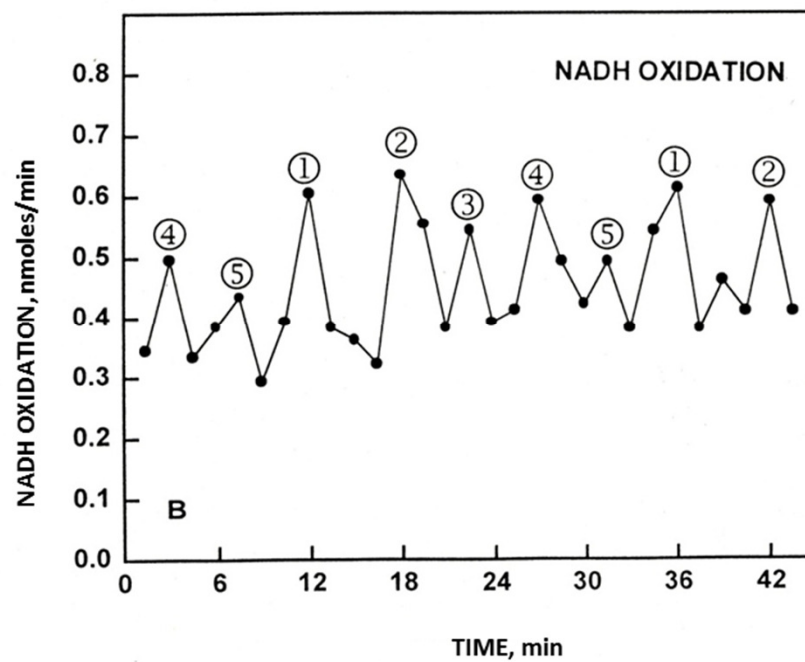
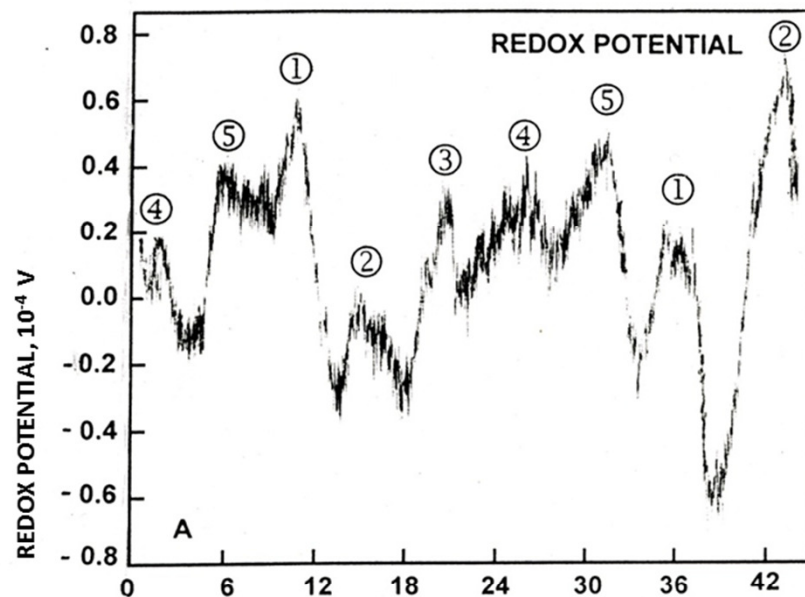
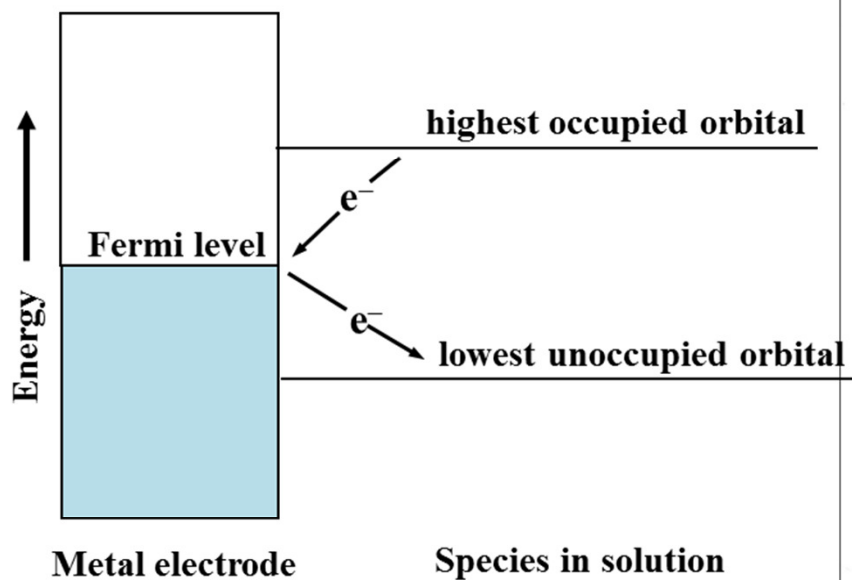
“LIKE LIKE LIKE”

E. E. Fesenko

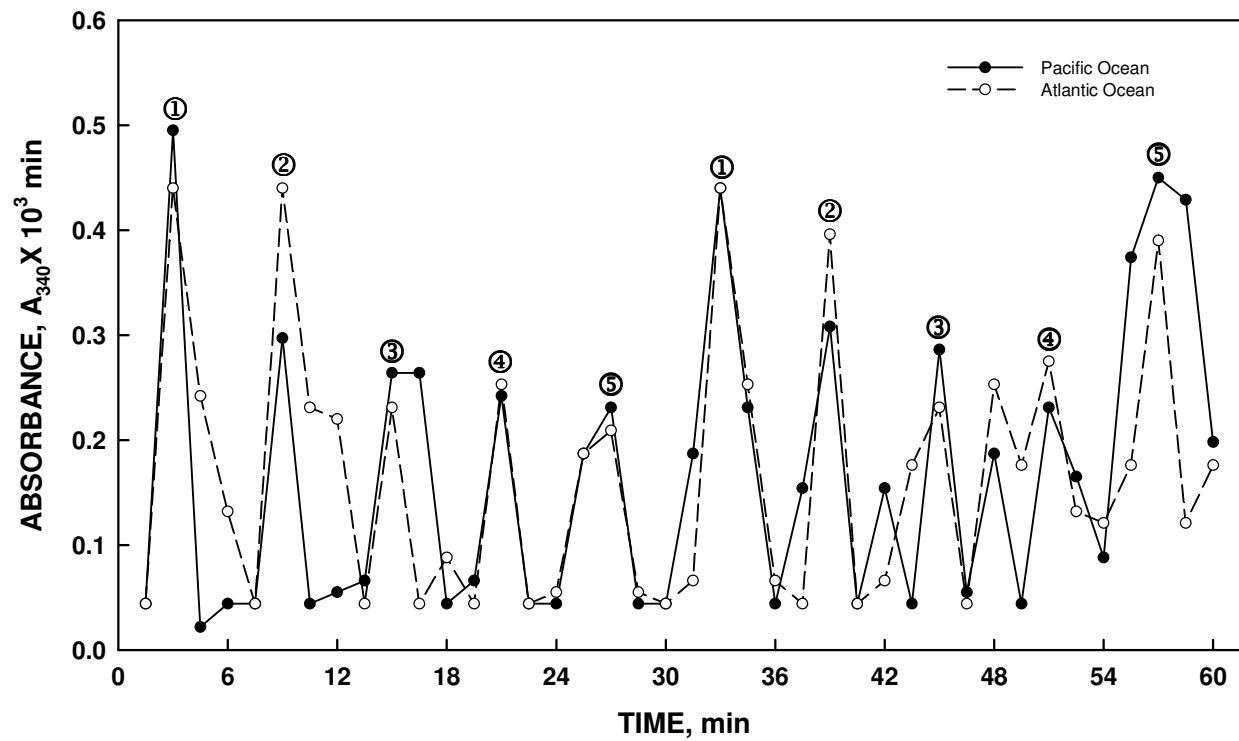
R. Sarimov and V. Binhi

EMF

Cu (II) OSCILLATIONS IN REDOX POTENTIAL



PAN-OCEANIC SYNCHRONY OF ORTHO-PARA WATER OSCILLATIONS





Summary

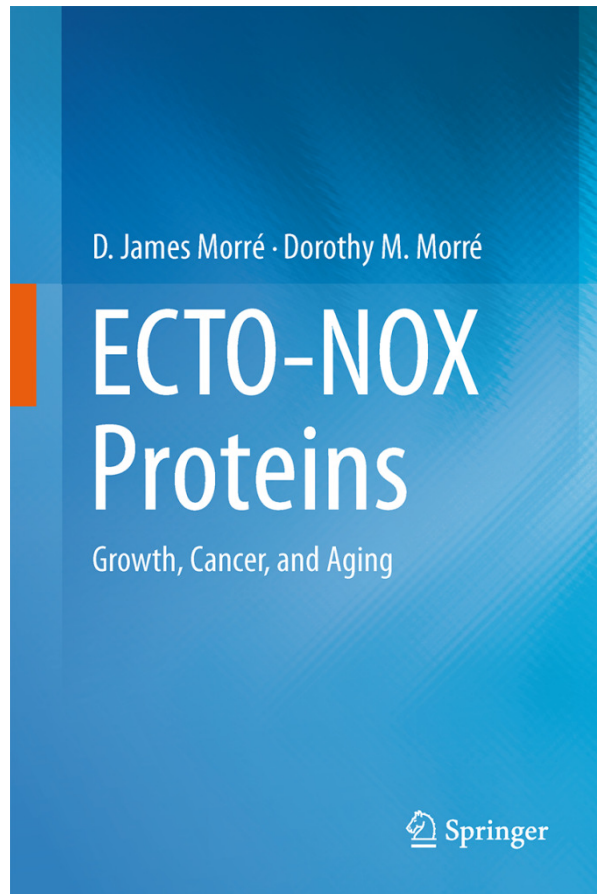
1. Water exhibits oscillations in redox potential sufficient to catalyze oxidation of NADH – 18 min period length
2. Addition of ions changes period length-Cu⁺⁺ to 24 min Na⁺ to 30 min
3. Asymmetric repeating pattern (2 + 3)
4. Oscillations attributed to ortho-para disequilibrium (Pershin/Drozdov)
5. Characteristics of a limit oscillator (Pershin)

SUMMARY (continued)

- 6. Based on luminescence data – Fundamental period length some multiple of 1.2 (?) sec (Zaharov)**
- 7. Algebraic summation yields “carrier wave” with 18 min period (Morré, Morré and Zaharov)**
- 8. Synchrony is achieved by communication among adjacent water molecules by low frequency EMF(Fesenko/Binhi)**
- 9. Water molecules form contiguous systems (Del Giudice/Voeikov)**
- 10. Also oscillatory (Pollack?)**

TAKE HOME LESSON

Because of synchronous ortho-para disequilibrium and oscillatory electromagnetic fields thus generated contiguous water molecules are able to communicate with each other over extremely long distances (Pan oceanic)



- ❖ The book chronicles the discovery of the ECTO-NOX proteins that serve as biological oscillators of the cell's biological clock.
- ❖ A chapter is devoted to derivation of oscillations from highly synchronized alternations in the ratios of ortho and para spin pairs of water hydrogens on an ENOX-associated copper hexahydrate.
- ❖ Implicated in maintenance of coherent water.

Now available at a pre-publication tax-deductible price of \$100.