

# **TGD BASED VIEW ABOUT QUANTUM BIOLOGY**

## **General Concepts and Ideas**

**Matti Pitkänen**

**<http://www.helsinki.fi/~matpitka/conscbooks.html>**

**matpitka@rock.helsinki.fi**

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# Basic conceptual framework

To the beginning

- **TGD inspired theory of consciousness.** Quantum jump as moment of consciousness. Notion of self. Self hierarchy.
- **p-Adic physics as physics of cognition and intention.**
- **New view about the relationship between experienced and geometric time.** New view about memory and intentional action.
- **Many-sheeted space-time.** The notion of magnetic body.
- **Dark matter hierarchy and dynamical Planck constant: zooming.** Hierarchy of macroscopic quantum phases. Dark EEG photons can have energies above thermal threshold.

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# Applications

To the beginning

- **“Dropping” of particles to larger space-time sheets as a universal mechanism of metabolism.** Quantum credit card as a mechanism of remote metabolism.
- **TGD based view about high Tc super-conductivity.** New view about cell membrane.
- **Effects of ELF em fields on vertebrate brain.** Cyclotron condensates of dark ions at flux quanta of dark magnetic field.
- **A model for a hierarchy of EEG:s.** Dark matter at magnetic flux body receives information from and controls ordinary matter in living system.
- **The notions of super- and hyper genome.** Great leaps in evolution as increases in the largest value of Planck constant associated with the system.

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# Many-sheeted space-time

To the beginning

- Both microscopic and macroscopic structures correspond to topology of space-time. Physical objects as space-time sheets. **Many-sheeted space-time.**
- **Topological field quantization.** The notion of field/magnetic body. Magnetic flux quanta, **massless** extremals/ topological light rays.
- **Universal metabolic energy quanta.** “Dropping” of particles to larger space-time sheets can liberate metabolic energy as zero point kinetic energy. General mechanism of metabolism. Metabolic energy quanta universal and determined by **p-adic length scale hypothesis.**
- **Hierarchy of scaled variants of standard model physics.** Long ranged QCD, ew interactions in various length scales.

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# Dark matter and p-adic hierarchies

To the beginning

- **Dark matter hierarchy and dynamical Planck constants.** Hierarchy of macroscopic quantum phases. Zoomed up variants of particles with same masses.  $h(M^4) = n_a \sum h_0$  and  $h(CP_2) = n_b \sum h_0$ . Observed Planck constant  $h_{\text{eff}} = (n_a/n_b)h_0$ .
- Preferred values of  $n_a$  and  $n_b$  correspond to **n-polygons constructible using compass and ruler** number theoretically suggestive since the quantum phase  $\exp(i\pi / n)$  is expressible using iterated square rooting to rational number and thus very simple :

$$n = 2^k \prod_s F_s, \quad F_s = 2^{2^s} + 1, \quad s=0,1,2,3,4,?$$

Given  $F_s$  at most once. The known **Fermat primes 3,5,17, 257,  $2^{16}+1$ .**

- $n=2^{k+1}$ ,  $k=0,1,2,\dots$  **seems to be favored in living matter.**  $2^{11}$  fundamental constant in TGD

- **p-Adic space-time sheets as correlates of cognition and intention.** Discrete number of rational (algebraic) points common with real space-time sheets.
- **p-Adic fractality due to p-adic effective topology. p-Adic length scale hypothesis:**  $p \cong 2^k$ ,  $k$  integer, preferably prime.
- **Mersenne primes  $2^n-1$  and Gaussian Mersennes  $(1+i)^n -1$**  important for elementary particle physics.
- **Number theoretical miracle:  $k=151,157,163,167$  define Gaussian Mersennes** spanning the range 10 nm--2.5 microns. These length scales are crucial for living matter.

# New view about time and energy

To the beginning

- **Inertial (or Poincare) energy conserved.** Sign of energy depends on time orientation of space-time sheet. **Negative energy space-time sheets.** Possible to distinguish between positive energy particle propagating to geometric future and negative energy particle propagating to geometric past if super-canonical conformal weight expressible in terms of zeros of Riemann Zeta is complex.
- **Negative energy signal corresponds to phase conjugate photon:** positive energy photon propagating to geometric future is **not** equivalent with negative energy photon propagating to geometric past. **Phase conjugation corresponds to conjugation for super-canonical conformal weights** expressible in terms of zeros Riemann zeta.
- Interpretation in terms of **phase conjugation** for laser photons generalized to apply to all particles.
- **Phase conjugate states** have negative time orientation. Second law in reversed direction of geometric time. Self-



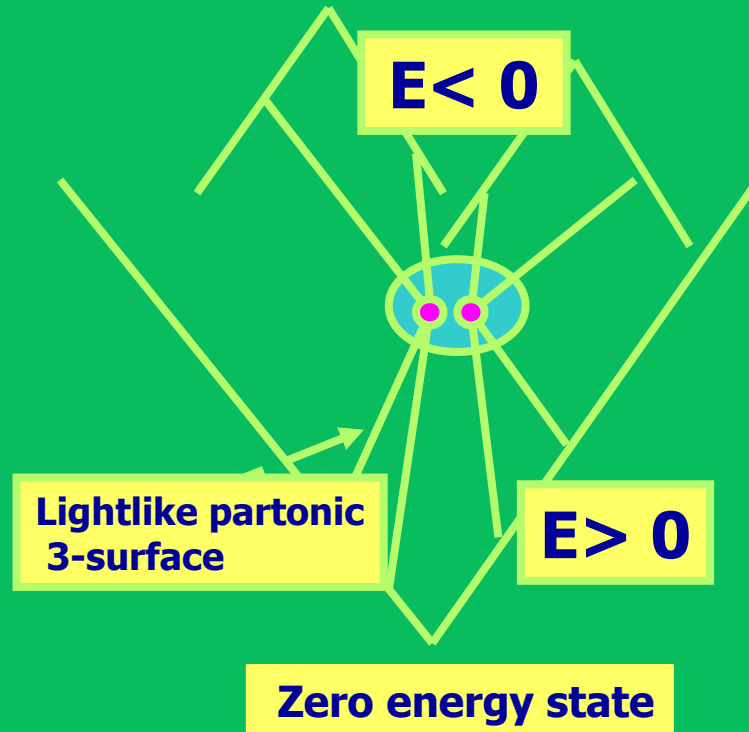
- **Zero energy ontology.** Physical states have vanishing conserved quantum numbers. Everything creatable from vacuum by intentional action (quantum jump transforming p-adic space-time sheet to real space-time sheet).
- **Initial/ final states** of particle reaction correspond **positive/negative energies.** Positive energy ontology good approximation if temporal distance between positive and negative energy states long in time scale of perception.
- **New interpretation for coherent states of Cooper pairs!** Could also DNA and other biomolecules appear in quantum superposition.
- Could thermodynamical states involving “superposition” of states with different conserved quantum numbers have quantal counterparts?

- **Remote metabolism** by sending negative energy to a system able to receive it, say population inverted laser. Dropping of particles to larger space-time sheets and liberation of zero point kinetic energy.
- **General mechanism of intentional action.** Intention to desire as p-adic-to-real transition. Desire to initiate action realized as negative energy signal to geometric past where it induces neural activity leading to the action. Negative energy topological light rays (M(assless)E(xtremal)s). Charged entanglement by massless W MEs). **Libet's finding** that neural activity precedes conscious decision support this view.
- Long term memories and new view about space-time. **Time mirror mechanism of memory recall.** Seeing into geometric past by time reflection from the brain of geometric past just like seeing in ordinary sense by ordinary reflection.

# The notion of magnetic body To the beginning

- **Magnetic body uses biological body as motor instrument and sensory receptor.** Communications and control using scaled variants of EEG. Josephson radiation and cyclotron radiation. Magnetic bodies contain dark matter in large  $\hbar$  phase. Cyclotron BE condensates, Cooper pairs.
- Findings of **Libet** and others about **strange delays of consciousness** can be understood as time delays due to the communication of sensory data to the magnetic body. Onion like structure.
- **Mechanism for intentional action applied by magnetic body.** Makes system extremely flexible. **Charged entanglement** and large  $\hbar$  negative energy quanta of exotic  $W$  bosons make possible remote control by inducing modifications of classical em fields at space-time sheets of ordinary inducing ionic currents in living matter. Many-sheeted Faraday law.
- Magnetic body as user of metabolic energy using **quantum credit card** by sending negative energy to the energy storage - **Extreme flexibility.** **Return**

# S-matrix in zero energy ontology

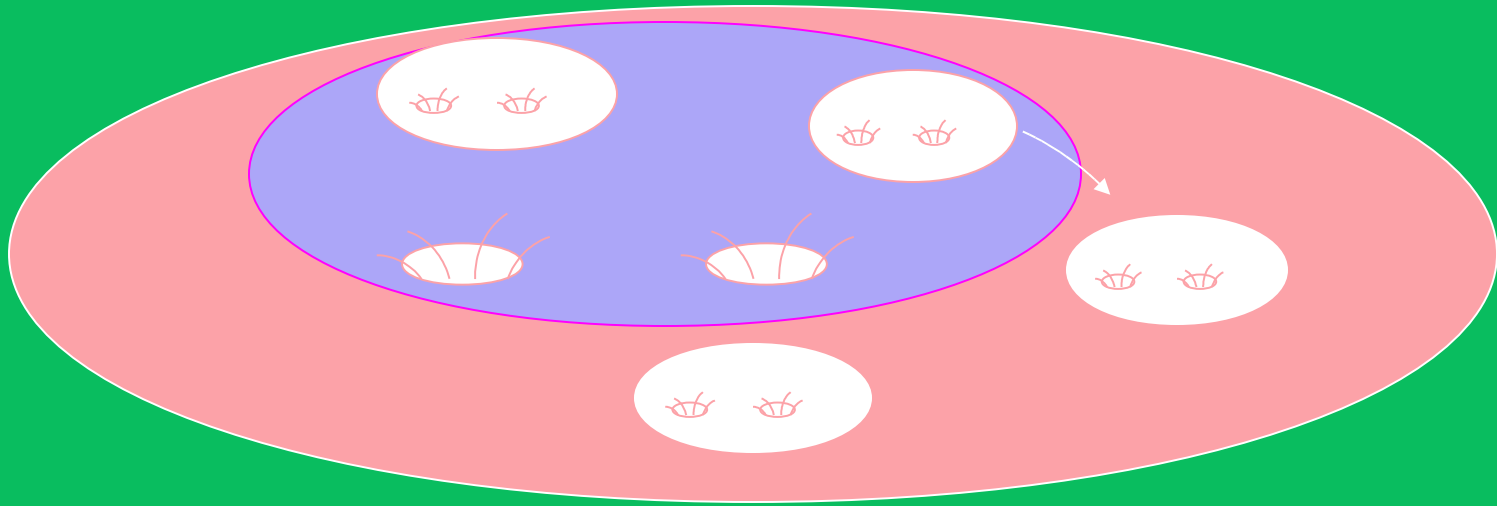


● Partonic 2-surface  $X^2 =$  intersection of incoming lightlike partonic 4-surfaces (!). Note that their interiors do not intersect! Necessary for realizing quantum classical correspondence.

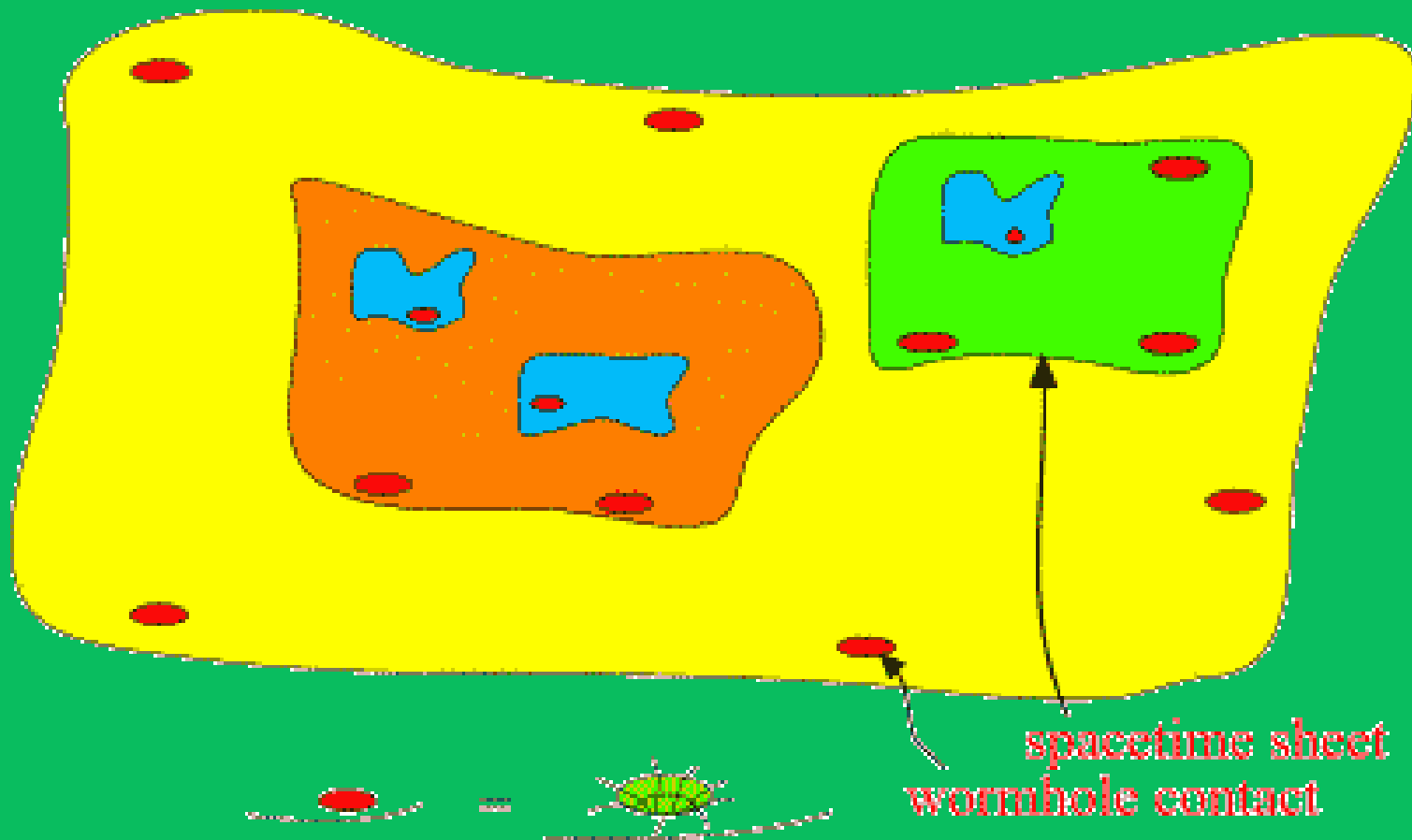
S-matrix unitary entanglement matrix:  $SS^\Sigma = \text{Id}$ ,  $\text{Tr}(\text{Id})=1$ .

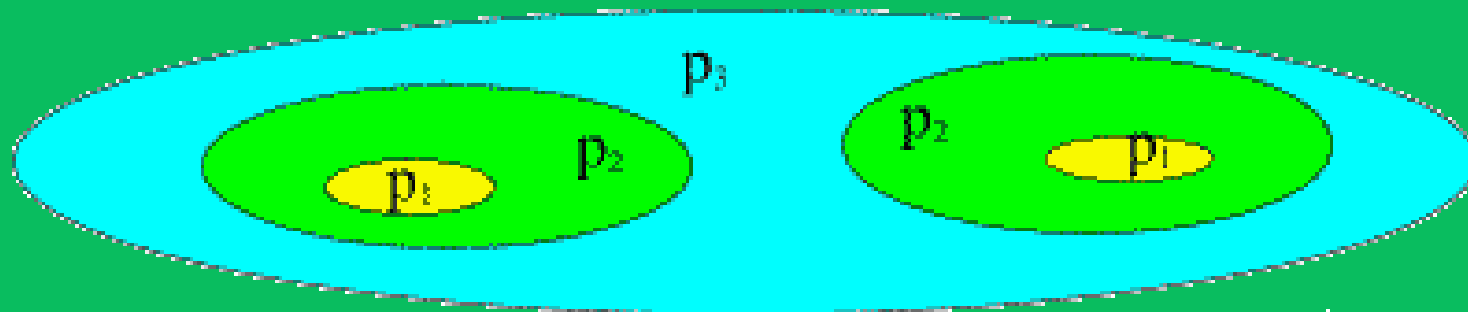
# Many-sheeted metabolism

To the beginning



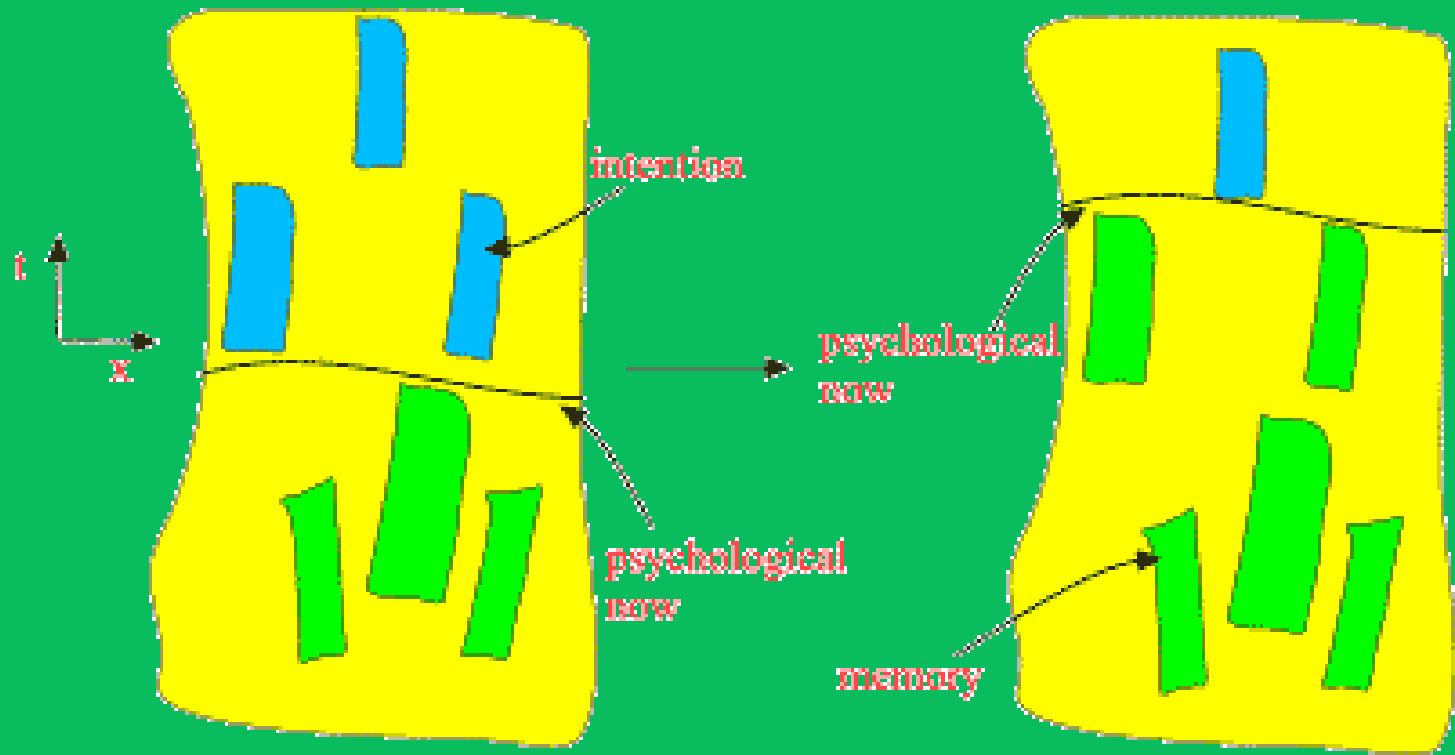
**Free particle drops to a larger space-time sheet  
and liberates zero point kinetic energy**



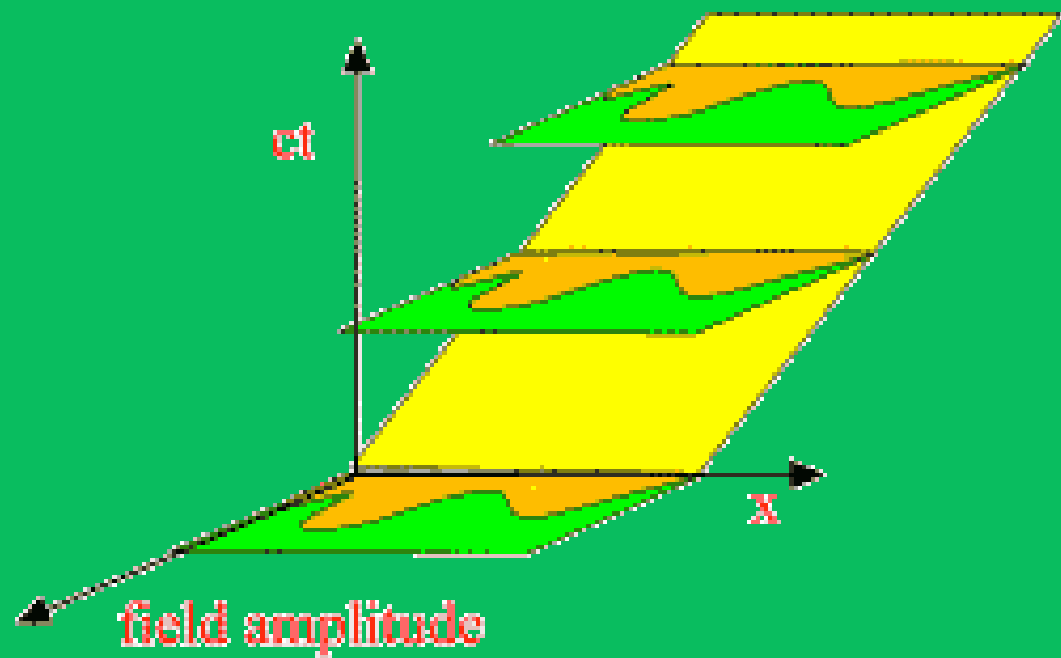


$$p_1 \subset p_2 \subset p_3$$

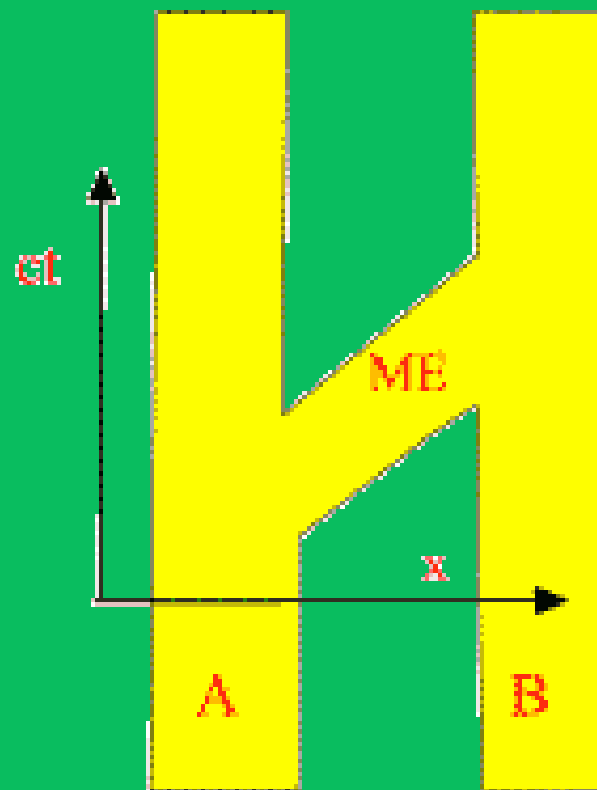
Effective p-Adic  
 topology in some  
 length scale range  
 Typical size of space  
 time sheet is  $L_p$  or  $L_p(n)$







a)



b)