Social Laser:

Stimulated amplification of social actions

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Physical and social laws

- Planets are not falling apples, but Newton's law does not care about their differences.
- Is it possible that the basic structure of a set of rules, a mathematical

theory, formulated for very complex and mysterious systems, such as quantum systems, might also account for the complexity of social behaviors of a large number of individuals, "social analogs of atoms (s-atoms)", ignoring unessential details?

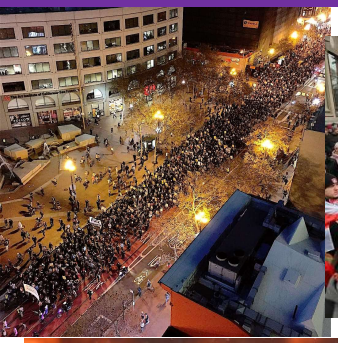
- My answers is "yes", it is possible! I do this in my book

by focusing on very important processes, such as the formation and the propagation of "waves of social protests, from color revolutions to Brexit and Trump and anti-Trump protest, the recent protests in Minsk and Moscow".

Andrei Khrennikov – “Social Laser”,

https://www.jennystanford.com/9789814800839/social-laser/

- I call these processes Stimulated Amplification of Social Actions (SASA), or in a more suggestive terminology “social laser”, and analyze features of quantum information that in a social system can lead to SASA.
- My aim is to show that applications of quantum theory to humanities are not exoticisms.
- I also point to open problems to be settled, such as a complete characterization of social resonators (in analogy to optical cavities) - Echo Chambers based on social networks, the role of information overload and information processing, the determination of parameters determining the criticality of social lasing.




UKRAINE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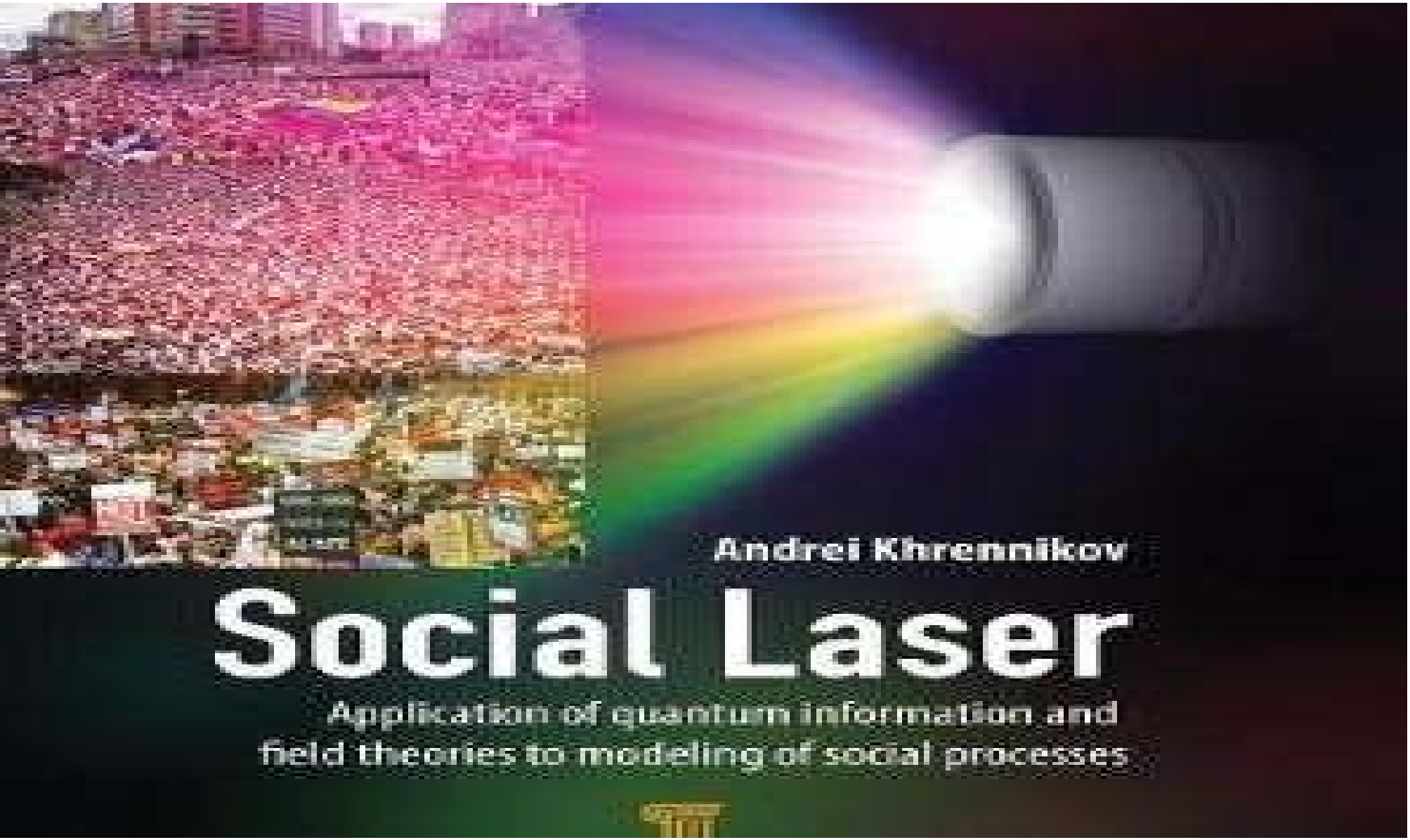
LIVES
MATTER.


Andrei Khrennikov
Social Laser
Application of quantum information and
field theories to modeling of social processes

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Social Energy

- The construction of the social laser theory in analogy to the laser physics requires the introduction of the novel notion of the 'social energy' (psychic energy) as an observable quantity characterizing the social system, not as one of its internal features.
- The quantum measurement approach is very useful in formalization of the notion of social energy as well as other social quantities.
- In quantum theory (at least the Copenhagen interpretation), quantities are not the properties of objects, but characteristics of measurement procedures.
- To define social (psychic) energy, we need not go deeply to human psyche and sociology (cf. with Freud, Jung, James). In the simplest case, we just establish the scale, say 0="relaxed" and 1="excited" and the procedure of determination of these states of humans.

Social atom, s-atom

- Human society as well as matter has the discrete structure, humans play the role of atoms, social atoms (or shortly s-atoms).
- Physical atoms have the discrte structure of energy spectrum; in the simplest case, just two levels, E0= ”relaxed” and E1=”excited”.
- We also consider simplest s-atoms, having two social energy states.
- A physical atom, can interact with the surrounding electromagnetic field and absorb or emit discrete portions (quanta) of energy, D= E1-E0. The crucial point is discreteness of this process. Atom in the relaxed state cannot ”eat” first say D/2 and then the rest D/2. It eats either D or nothing. The same with emission for excited atom, it should emit prcisely D-quant.

Classilcal vs. Quantum absorption and radiation Swedish buffet vs. Restaurang

- Consider classical electromagnetic field and atenna (say for radiosignals), the process of absorption and emission of energy is continuous.'
- We can metaphorically imagine Swedish buffet
- Consider now quantized electromagnetic field and atom, the processes are discrete.
- We can imagine a restaurang with fixed portions of food.
- Diffrent atom have the different spectra, D=E1-E0, they can absorb and emit only such portions of energy.
- In a restaurang, different clients can ask for portions of different size (depending on their characteristics)

Quantum food consumption

Quantum fields: information vs. electromagnetic fields

- In social lasing, the crucial role is played by the information field, portions of information emitted by mass-media and social networks in the form of coomunications, posts, comments.
- Here it is also important to point to the difference between descriptions of classical and quantum fields. The latter is not a wave that is continuously propagating in space-time. It is colelction of discrete portions of energy, quanta. Its description is very abstract, generalized operator valued function. Basic variables are operators of creation and annihilation of energy quanta.
- In same way, we can mathematically describe the information field, communications play the role of quanta. Each of them carries a portion of social energy. Social atoms absorb and emit quanta of social energy.

Quantum information field

- In quantum theory, fields are not ”physical waves” propagating in physical space-time. These are mathematical quantities representing the process of exchange of energy quanta, field’s excitations.
- In this quantum way, we introduce the information field, with operators of creation and absorption of quanta of social energy.
- Each communication is endowed with a batch of quanta of social energy.
- Quantization is the property of humans (measurement devices): people react only to communications of sufficiently high social energy, otherwise they ignore communications. The energy spectra acceptable to reaction depends the type of s-atom.

How does a conventional laser work? Stage 1: energy pumping

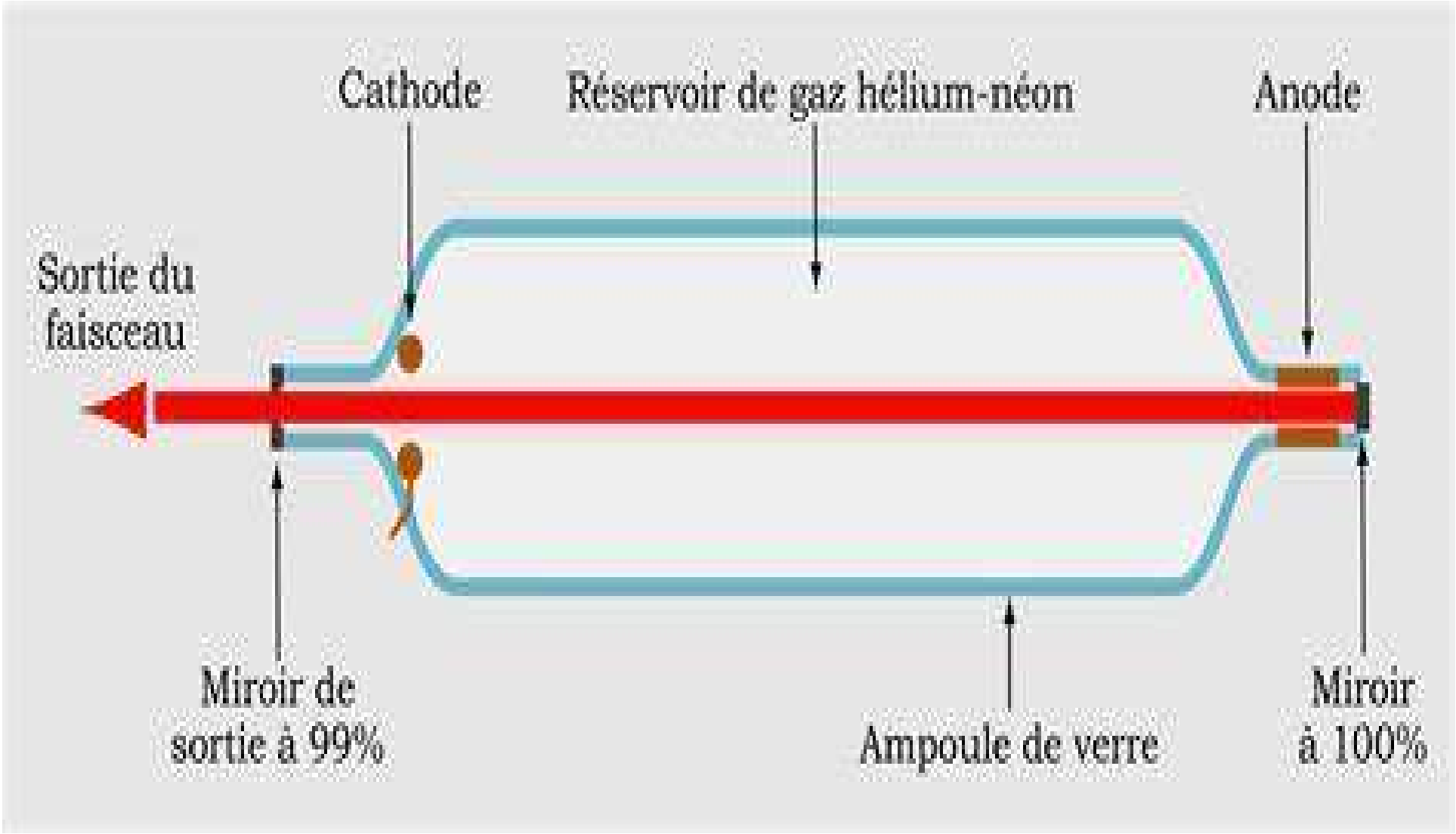
- There is an active medium, a large ensemble of atoms.
- Energy is pumped into this medium, atoms are transferred to an excited state.
- Pumping occurs with quanta of light energy, photons.
- An unexcited atom, having eaten a photon, passes into a state of excitation.
- However, at any moment an atom can spontaneously fall into an unexcited state, spitting out the swallowed portion of energy. In general, you need to contrive that the active medium reaches the state when more than half of the atoms are excited. This state is called *the population inversion state*.
- At first, almost all the atoms were in an unexcited state, and then, during the process of energy pumping, most became excited.

Stage 2: Stimulated emission

- When active medium has approached the state of population inversion, a batch of coherent photons (quanta of energy) is injected into active medium. Photons fly in the same direction and they have the same characteristics.
- These injected photons generate the stimulated emission of photons (quanta of energy) by excited atoms.
- The main feature of emited photons is their coherence copied from the injected photons. In particular, if injected photons propagate in some direction, emitted photons will go in the same direction.
- Each of emitted photons also interact with excited atoms and induce new emission – cascade process, exponential increasing of power!

Laser’s resonator

- To make the beam of photons even more powerful, laser is equiped with the resonator, typically optical cavity.
- The beam of photons generated from the initializing batch of photons should go back throgh the active media, reflected from the mirrow.
- In this way, beam’s power can be increased essentially.
- Resonator has another very important function: it improves the coherence of radiation. If some light ray goes to ”wrong direction”, the mirrow reflects it out the main beam (the same process takes place for quanta of electromagnetic field).


Cathode
Réservoir de gaz hélium-néon
Anode
Sortie du faisceau
Miroir de sortie à 99%
Ampoule de verre
Miroir à 100%

Principles of Social Lasing

Social laser theory presents the general scheme for generating giant waves of social action. This scheme, like the scheme of a physical laser, is simple and there are two basic steps:

1). *Pumping the human medium with social energy.*

2). *Stimulating coherent social action by injecting a batch of homogeneous messages into the agitated medium.*

Conditions for succcessful intiating of social lasing: s-atoms

- Humans play the role of social analogs of atoms. However, discrete systems behave in the quantum way, demonstrate quantum statistics, only under condition of indistinguishability.
- Indistinguishability is the crucial feature of quantum systems, atoms as well as photons, having equal energy (and a few other observable characteristics) are indistinguishable.
- They so to say have not passports (or may be they have passports, but do not want to show them to observers – the problem of hidden variables in quantum physics).
- So, humans, to be a good active medium for social lasing, should lose their individuality, no national, cultural, religious, and even sex differences.
- Only energy spectrum is important, the magnitude of social energy quanta,which s-atom can absorb and emit.

Contentless information

- Information communications, posts, comments (in social networks) are carriers of social energy quanta. So, they have to be indistinguishable, like photons in quantum physics, up to a few observable characteristics. Social energy is the basic one.
- S-atoms should lose the ability to analyze deeply communication content.
- They just absorb social energy: murders, catastrophic events, wars, and epidemics are very good for such social energy pumping in ”active medium” composed of s-atoms.

Information overload as one of the basic conditions for quantum-like behavior

- Mass-media and social networks generate very powerful information fields
- s-atoms detecting these fields are permanently in the state of information overload.
- To save their computational and time resources, they process information automatically, without deep analysis of its content.
- Clip thinking, s-atom lose ability to rational thinking.
- They absorb onlý labels of communications and absorb portions of energy corresponding to these labels.

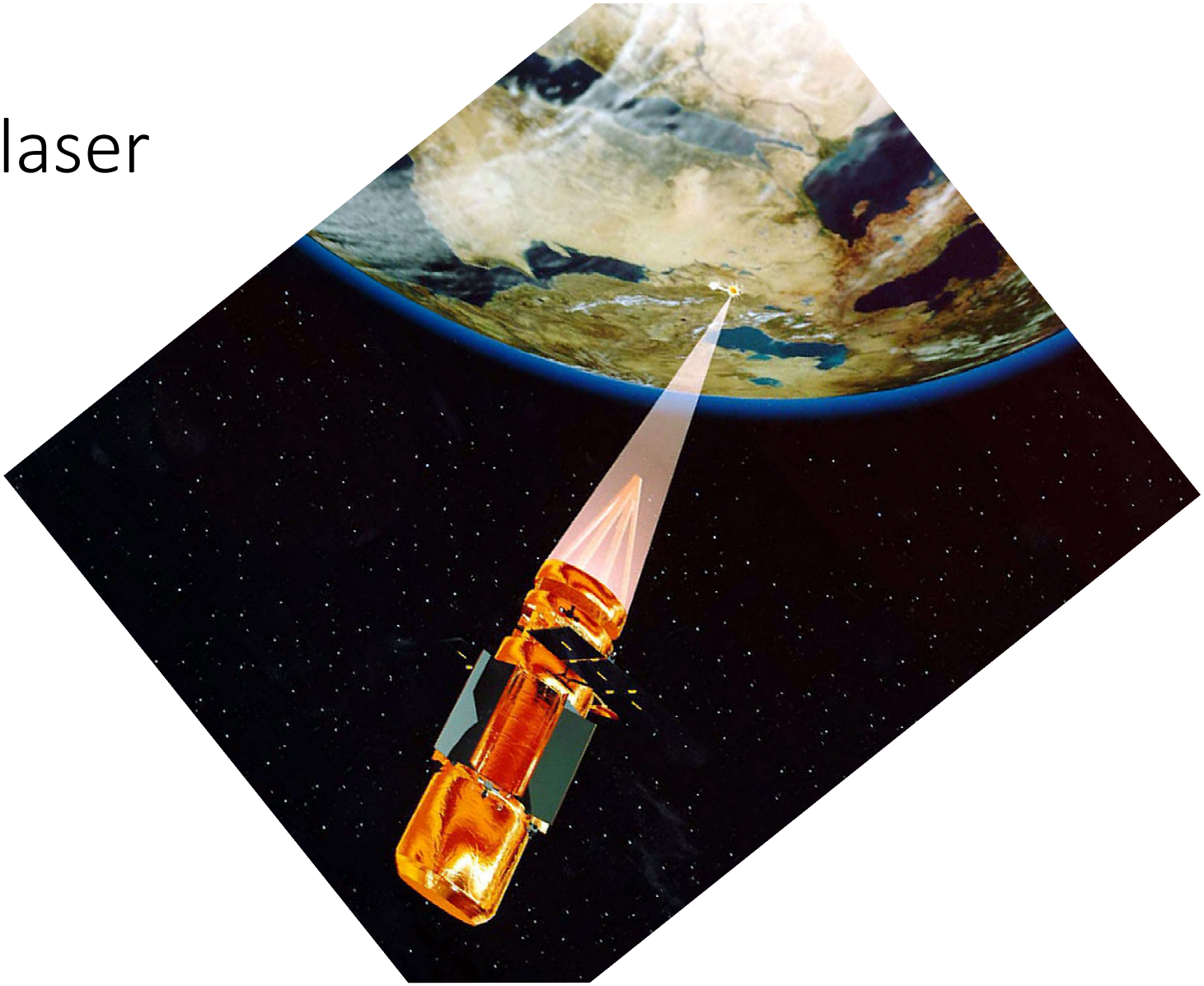
Social lasing and modern society

- a) *transformation of people into social atoms - loss of individuality;*
- b) *creation by the mass media and social networks of powerful information fields leading to information overload of social atoms and automatic information processing;*
- c*) creation of powerful social resonators based on Internet echo chambers.*
- P.S. Social lasers have been working even before, but nowadays it became easier to put them in action, to pump energy into s-atoms and to stimulate coherent beams of social excitations.

Who can put a social laser in action?

- As was shown, the modern society is a very good system for initiating social lasing, stimulated amplification of social actions.
- Any group of people having sufficiently powerful information resources can prepare and start social lasing -- states, political parties, clans, corporations.
- Social laser is the most powerful weapon of future battles.
- And this is the weapon of mass distraction.
- However, the process of social lasing can be put in action automatically – if society is in the state of population inversion.
- Thus, nowadays social lasing can be self-generated worldover,
- Social tsunamies will be more often.

Military laser



Cosmic laser