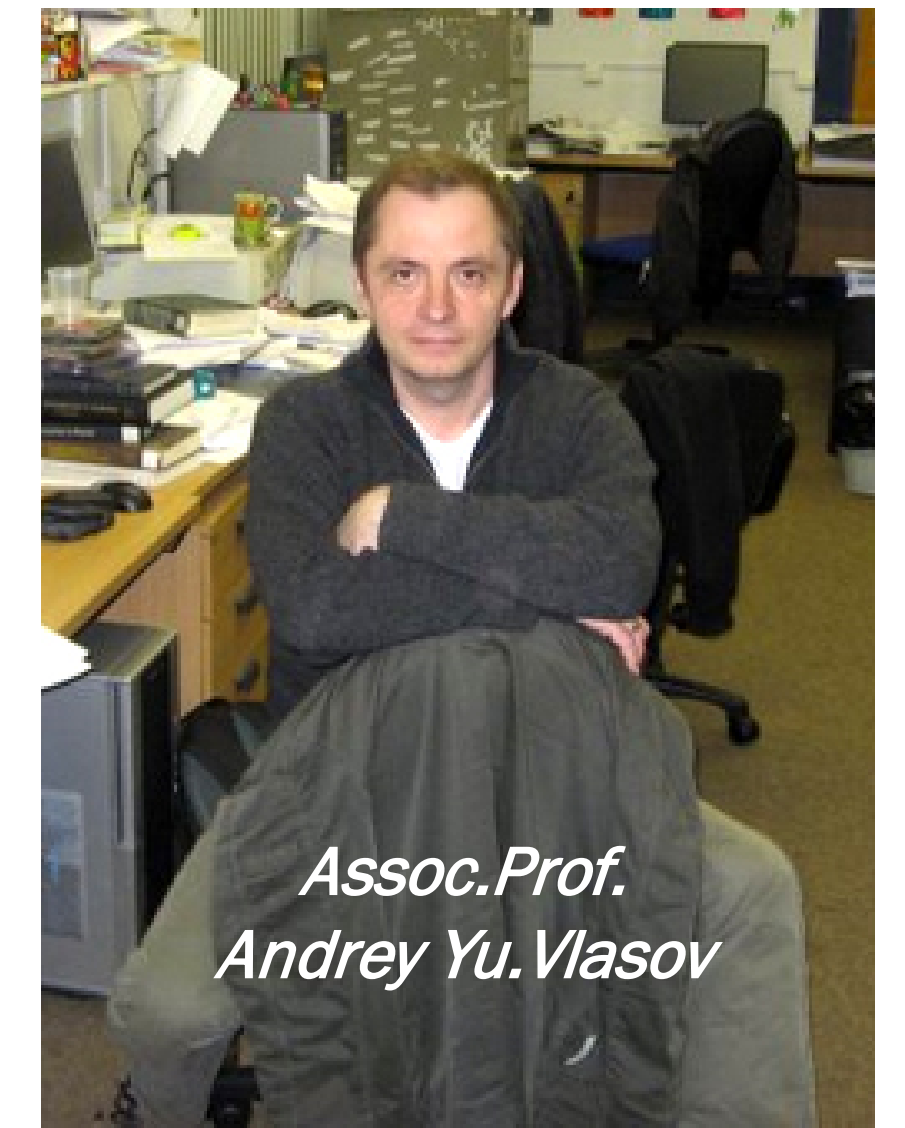
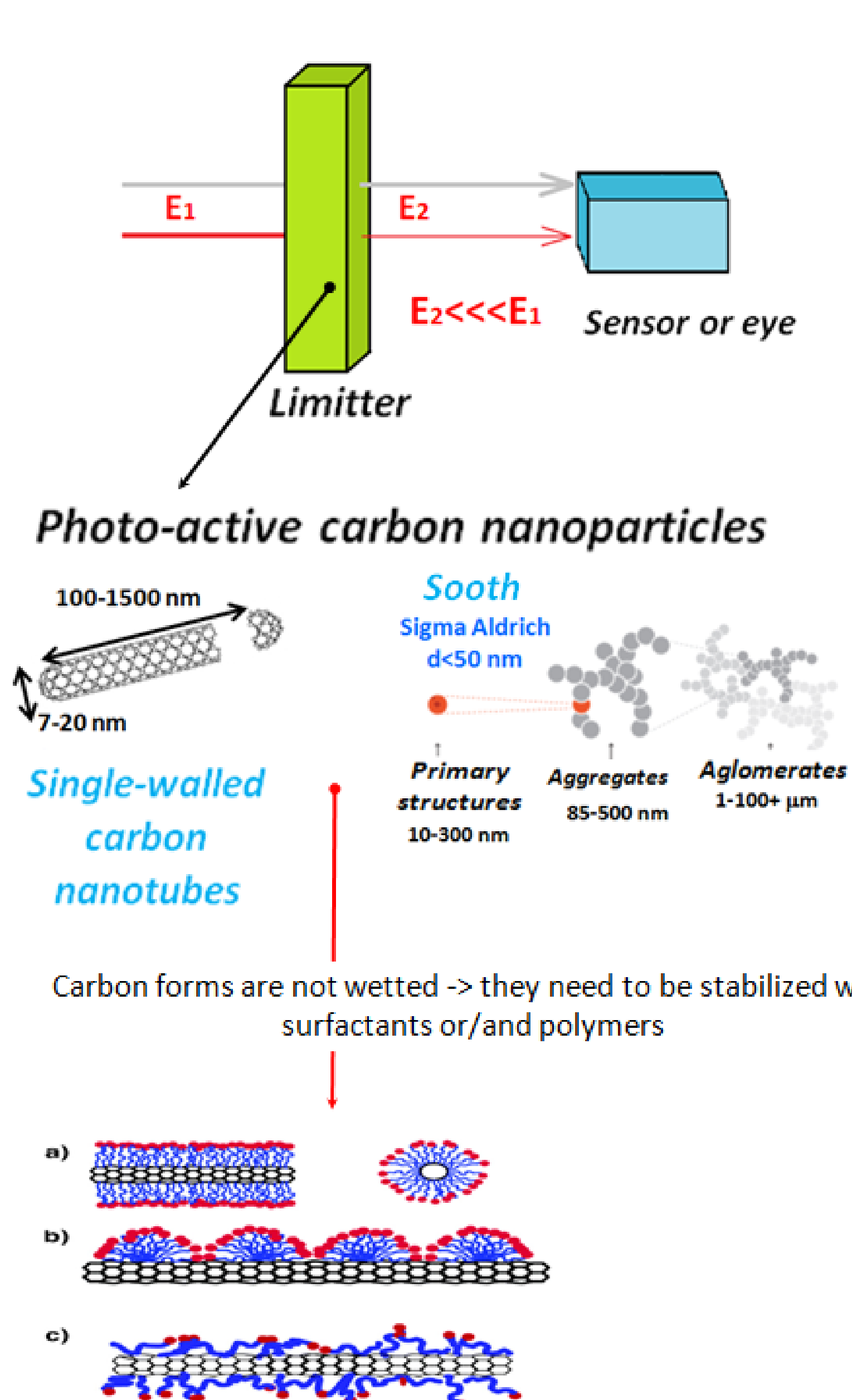


Phase, structural, thermodynamic and optical properties of condensed systems with micro-inhomogeneities



Assoc.Prof.
Andrey Yu. Vlasov

Non-linear optical limiting in aqueous organic suspensions of nanocarbon



Optical limiting effect: photon excitation of the electronic structure of nanocarbon converts electromagnetic energy into heat, which creates inhomogeneities in the medium, such as bubbles during local boiling. The laser beam is scattered on inhomogeneities and the light intensity is quenched

Considered issues:

Obtaining data on the stability of suspensions with optimal properties by methods of physico-chemical experiment for the design of materials aimed at protection of sensors and eyes against laser damage; study by methods of nonlinear optics (z- and E-scanning) of target optical characteristics

Journal of the Optical Society of America B, **38** (2021) C198
Micromachines, **12** (2021) 1–10
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Applied Physics Letters, **100** (2012) 251903

Collaboration:



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National Research Institute ITMO

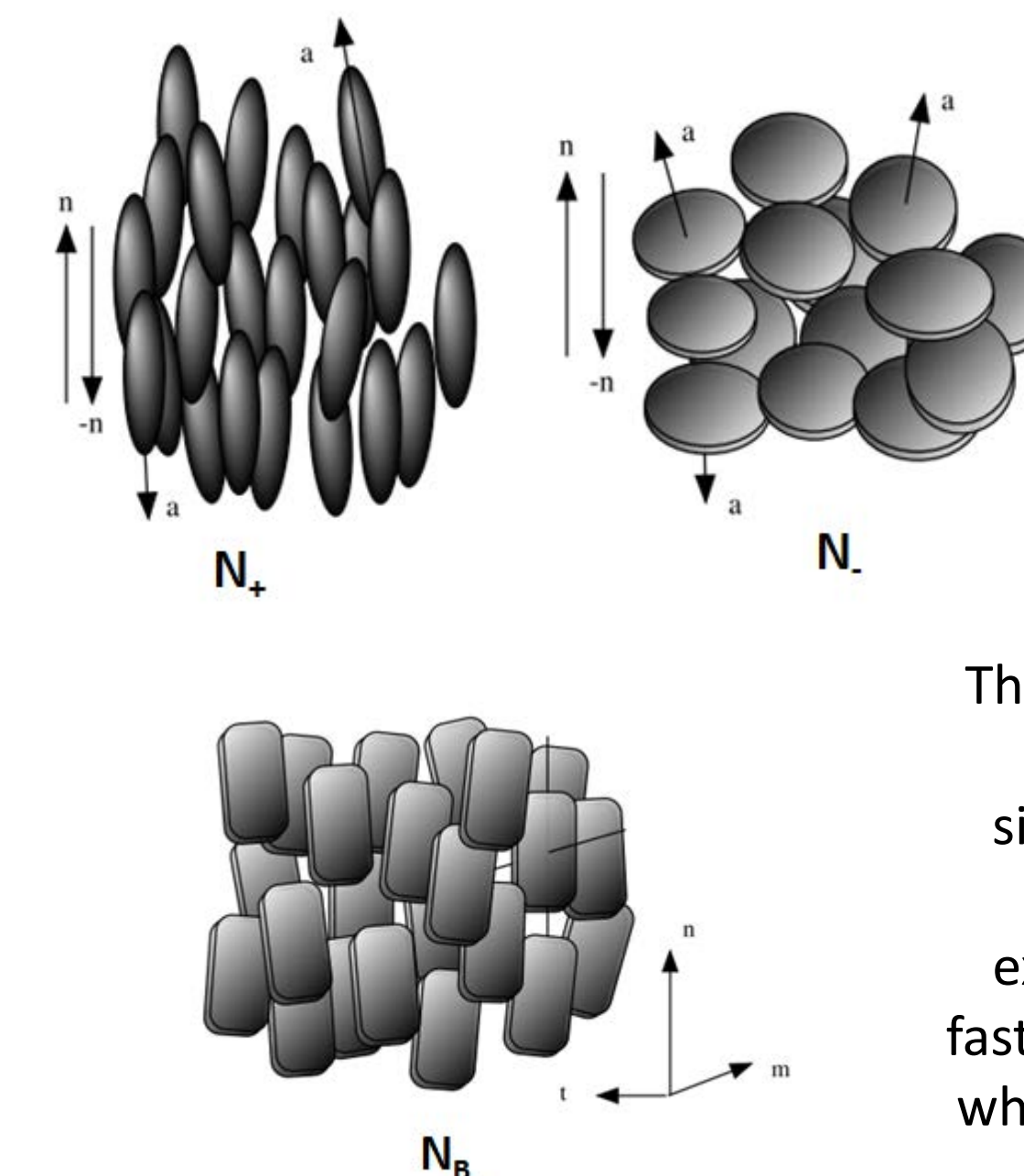


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Stability of liquid crystal phases in thermotropic and mineral systems



In systems of non-spherical particles (spindles, disks, prisms, etc.), it is possible to form liquid crystal phases with a predominant orientation of the phase symmetry axes (nematic phases N_+ , N_-)

The issue of the formation of the biaxial phase (N_b), where two axes of the particles are simultaneously oriented along two mutually perpendicular directions, is topical. It is expected that the middle axes will provide a faster response time regarding an external field, which is promising for display technologies and telecommunication

Considered issues:

Prediction by methods of statistical thermodynamics modeling of the conditions for the formation of the biaxial phase depending on the shape, volumes of particles, particle interaction potentials

Colloids and Surfaces A, **532** (2017) 428–435
Molecular Physics, **104** (2006) 2901–2917