

【新闻快报】

M. Kostic教授, 美国北伊利诺斯大学讲座通知

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报告主题

Energy Fundamentals and Applications

Abstract (more at: www.kostic.niu.edu/energy):

Energy is a fundamental property of a physical system and refers to its potential to maintain a material system identity or structure (forced field in space) and to influence changes (via forced-displacement interactions, i.e. systems' re-structuring) with other systems by imparting work (forced directional displacement) or heat (forced chaotic displacement/motion of a system molecular or related structures). Energy exists in many forms: electromagnetic (including light), electrical, magnetic, nuclear, chemical, thermal, and mechanical (including kinetic, elastic, gravitational, and sound); where, for example, electro-mechanical energy may be kinetic or potential, while thermal energy represents overall potential and chaotic motion energy of molecules and/or related micro structure. Energy is the "building block" and fundamental property of matter and space and, thus, the fundamental property of existence.

Energy exchanges or transfers are associated with all processes (or changes) and, thus, are indivisible from time. At present, most of the World energy consumption is supplied by the fossil fuels (about 85%). However, the proven fossil fuel reserves are limited, and if continued to be used at the present rates, they will be depleted in relatively short period of time. At present, a substantial amount of World electricity is obtained from nuclear and hydro energy (close to 20% each), respectively, and use of other renewable energy resources is increasing, namely geothermal, wind, biomass and solar, as well as development of alternative synthetic fuels, including hydrogen, etc. It is worth noting that some countries produce almost all or most of their electricity from hydro energy (like Norway, Brazil, New Zealand, Austria and Switzerland), and France produces most of its electricity

from nuclear fuel (close to 80%). The nuclear fuel reserves are orders of magnitude higher than fossil fuels, and nuclear plants do not contribute to CO2 green-house pollution.

Furthermore, advances in energy conversion and utilization technologies and increase in efficiency, including computerized control and management, contribute to energy conservation, increase in safety, and reduction of related environmental pollution. Actually, per capita energy use in the U.S. and other developed countries is being reduced in recent years. However, the increase of World's population and continuous growth of many fast developing and very populated countries, like China, India and others, will influence continuous increase of the World energy consumption.

The two things are certain in not distant future: (1) the world population and their living-standard expectations will substantially increase, and (2) fossil fuels' economical reserves, particularly oil and natural gas, will substantially decrease. The difficulties that will face every nation and the world in meeting energy needs over the next several decades will be more challenging than what we anticipate now. The traditional solutions and approaches will not solve the global energy problem. New knowledge, new technology, and new living habits and expectations must be developed to address both the quantity of energy needed to increase the standard of living world-wide and to preserve and enhance the quality of our environment. However, regardless of imminent shortages of fossil fuels, the outlook for future energy needs is encouraging. There are many diverse and abundant energy sources with promising future potentials, so that mankind should be able to enhance its activities, standard and quality of living, by diversifying energy sources, and by improving energy conversion and utilization efficiencies, while at the same time increasing safety and reducing environmental pollution. After all, the life may be happier after the fossil fuel era!

See the Energy Pyramid:

www.kostic.niu.edu/energy/energy_pyramid.htm

美国M. Kostic教授简介

M. Kostic教授就任于美国北伊利诺斯大学（NORTHERN ILLINOIS UNIVERSITY）机械工程系，是热力学，流体力学和传热传质研究领域的知名学者，研究重点包括传热工艺设计、计算机数据采集和CFD模拟、聚合纳米材料技术、流体热系统能量转换利用的设计和优化等。

Kostic 教授1975年于Belgrade大学取得学士学位，并被评为优秀毕业生。在Vinca核科学研究所担任研究员后又任教于前南斯拉夫贝尔格莱德大学。1981年他作为Fulbright grantee就读于芝加哥伊利诺斯大学，1984年取得机械工程博士学位。其后，Kostic博士

在工业界工作了几年，并作为交换访问者出访英国，西德，和前苏联。

M. Kostic教授是费米实验室的客座科学家，美国阿贡国家实验室研究参与计划成员，美国机械工程师协会、美国工程教育协会以及美国物理学会流变学协会会员，曾入选马奎斯世界名人录和科学工程名人录（Marquis' "Who's Who in the World" and "Who's Who in Science and Engineering."）并获得多项奖励资助，如富布莱特基金资助、美国宇航局职员奖金等。Kostic教授还是专业领域多个期刊的特约审稿人和特约撰稿人，曾发表出版多篇（部）论文和著作。

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