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Micro-Nano hydraulics in hetero-structures developed for nuclear applications

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The development of micro-nano hetero-structures for nuclear power applications[1], such as CLM, "Cer-Liq-Mesh" (Ceramic fuel micro-beads,[2] immersed in a drain liquid, stabilized on elastic mesh) developed to separate the fission products from the nuclear fuel, using nuclear reaction kinematics, or "NCLH", (Nano-Cluster-Liquid Hetero-structure that uses an agglomeration of quasi nano-clusters sinter soaked in a drain liquid)[3], that accelerate extraction of nuclear transmutation products with applications in radio-isotope production, and the heat-pipe like cooling structures, require new progresses in understanding the liquid behaviour inside these structures where the fluids flow are affected by the fluid-solid interface interaction, molecular effects and exposure to nuclear radiation that to produce developments in theory, computer simulation codes and benchmarking systems. A section in a nuclear reactor novel hetero-fuel is presented where the cooling flow, washes the cladding which contains inside a NCLH structure embedded into a CLM structure, each with its flow, and its specific challenges.

Biography

Liviu Popa Simil is a nuclear engineer, physicist with 30+ years experience in nuclear power related applications. He is the Director of LAAS,- Los Alamos academy of Sciences, president of LAVM LLC a nuclear research organization. He has published more than 300 papers in peer-reviewed journals and is a member in many professional organizations as ANS, MRS, IEEE, etc.

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