Budapest Neutron Centre

a neutron star in research and innovation

BNC – a multidisciplinary centre for natural sciences – operates the largest research infrastructure in Hungary, the Budapest Research Reactor and its 14 beam lines. The Budapest Research Reactor has been utilized as a neutron source for scientific investigations and as a complex source of irradiations for materials testing and modification, diagnostics in nanotechnologies, engineering and healthcare. It serves the society by producing radionuclides for the industry and medicine, diagnosis and radiotherapy.

* Consortium of the Centre for Energy Research and Wigner Research Centre for Physics of the Hungarian Academy of Sciences

SCIENCE, INNOVATION, PRODUCTION AND SERVICES IN NEUTRON IMAGING, NEUTRON ACTIVATION AND NEUTRON SCATTERING.

NEUTRON IMAGING

Neutrons, being electromagnetic, non-directional waves, involute the internal structure of objects in 2D and 3D to images.

- material fatigue (e.g. in engines, components, gear boxes, hydrogen storage tanks, fuel cells, wind turbines)
- material flow in liquids (e.g. water and oil)
- molecular and phase transitions,甚至 materials, вstem, metal and wooden artefacts
- differentiates between hydrogenous materials, e.g. in engines, components, gear boxes, hydrogen storage tanks, fuel cells, wind turbines
- differentiates between isotopes easily, e.g. in engines, components, gear boxes, hydrogen storage tanks, fuel cells, wind turbines
- differentiates between isotopes weakly, e.g. in engines, components, gear boxes, hydrogen storage tanks, fuel cells, wind turbines
- discerns between isotopes strongly, e.g. in engines, components, gear boxes, hydrogen storage tanks, fuel cells, wind turbines

BNC Instruments: RAD, NORMA, RAD, NORMA

NEUTRON SCATTERING STUDIES ON THE ATOMIC, NANO- AND THE MICRO SCALE

- Material: crystallography and microstructure analysis
- Energy: materials for nuclear and alternative energy, storage and conversion
- Life: complex biological structures, membranes, fractals, localization elements on the meso- and macro-scale
- Food: structure-function relationships in food components, lipids, proteins, polysaccharides

BNC Instruments: SANS, PSD, TOF-ND, MTEST, GINA

NEUTRON ACTIVATION FOR RADIOISOTOPE PRODUCTION AND ANALYSIS

- Production of radionuclides for diagnosis, therapy and non-destructive analysis (NAA and PGAA)
- Applications in the mining industry, archaeology, biochemistry, nuclear and radiation safety
- Quality assurance, certification of medical devices, food, and agricultural products
- Trace element uptake and toxin analysis of hair, blood
- Toxicity in fish and agricultural products, impurities in oils and lipids

BNC Instruments: PGAA, NIPS, NAA

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