NEUTRON-RICH NUCLEI IN HEAVEN AND EARTH

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An accurately calibrated relativistic parametrization is introduced to compute the ground state properties of finite nuclei, their linear response, and the structure of neutron stars. Among the predictions of this model are a symmetric nuclear-matter incompressibility of K = 230 MeV and a neutron skin thickness in ^{208}Pb of $R_n - R_p = 0.21$ fm. Further, the impact of such a softening on the properties of neutron stars is as follows: the model predicts a limiting neutron star mass of $M_{max} = 1.72\ M_{sun}$, a radius of R = 12.66 km for a "canonical" $M = 1.4\ M_{sun}$ neutron star, and no (nucleon) direct Urca cooling in neutrons stars with masses below $M = 1.3\ M_{s\ n}$.

VERA, A UNIVERSAL FACILITY FOR ACCELERATOR MASS SPECTROMETRY

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The Vienna Environmental Research Accelerator (VERA) is a facility for Accelerator Mass Spectrometry (AMS) primarily dedicated to the study of cosmogenic and anthropogenic radionuclides at the ultra-trace level. Isotope research at VERA covers the mass range from 1H to 244Pu, with 14C being by far the most-used isotope. This talk will review the many facets of VERA including applications in archaeology, astrophysics, atmospheric science, atomic physics, glaciology, and biomedical research. Recently, a project to study art objects with Proton Induced X-Ray Emission (PIXE) has also been started.

COVARIANT DENSITY FUNCTIONAL THEORY FOR EXCITED STATES IN NUCLEI FAR FROM STABILITY*

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An overview is given over applications of relativistic mean field theory for the description of excited states in nuclei, such as rotational bands in super-deformed configurations, low-lying collective vibrations and giant resonances. Methods going beyond mean field theory such as coupling to complex configurations and the Generator Coordinate Method are applied for the study of level densities in nuclei, the damping mechanism of giant resonances and for the description of transitional nuclei.

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CONSTRAINTS ON THE NUCLEAR ENERGY FUNCTIONAL FROM CALCULATIONS OF THE VIBRATIONAL STATES

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In this contribution, recent calculations of isoscalar and isovector nuclear excitations, including the charge-exchange modes, will be highlighted. The framework is the quasi-particle Random Phase Approximation (QRPA), starting from an Hamiltonian which includes a Skyrme force and an effective pairing interaction. Emphasis will be put on the relevance of self-consistency. The aim is to show that, by

means of these calculations, much can be learnt about basic physical observables like the nuclear incompressibility, the symmetry energy at, and around, saturation, the isoscalar and isovector pairing interactions.

STATE AND PERSPECTIVES OF DEVELOPMENT FOR ATOMIC ENERGY OF UKRAINE

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КОНЦЕПЦИЯ ПОСТРОЕНИЯ УПРАВЛЯЮЩИХ СИСТЕМ БЕЗОПАСНОСТИ (УСБ) НА ПРИНЦИПАХ "ЖЕСТКОЙ" ЛОГИКИ

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Представлены основополагающие принципы построения управляющих систем безопасности, реализованных с применением программно-технических комплексов разработки ЗАО "Радий", построенных на принципах "жесткой" логики.

Описаны:

- задачи, стоящие перед УСБ АЭС;
- принципы реализации поставленных задач в оборудовании ПТК УСБ;
- подходы к дифференциация задач на функциональные составляющие;
- вопросы интеграции оборудования в единое целое.

Рассмотрены также аспекты безопасности, возникающие в связи с отдельными решениями той или иной функциональной задачи. Показаны отдельные технические решения, которые заложены в технические средства для обеспечения основополагающих принципов безопасности.

Представлен также анализ соответствия ПТК требованиям украинского нормативного документа НП 306.5.02/3.035-2000 в части:

- единичного отказа;
- резервирования;
- независимости;
- наложения отказов.

Отдельно рассмотрены аспекты работы ПТК УСБ в составе системы (с датчиками и исполнительными механизмами) при возникновении аварийных ситуаций на энергоблоке АЭС. Особое внимание уделено вопросам живучести ПТК УСБ при проектных и запроектных авариях.

CHAOS IN NUCLEAR GROUND STATE AND EXCITED STATES

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RESULTS ON DARK MATTER AND RARE PROCESSES BY DAMA AT GRAN SASSO

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The DAMA experiment at the Gran Sasso National Laboratory of INFN is an observatory to investigate in model independent way the presence of cold Dark Matter particles in the galactic halo and several other rare processes by realizing various experimental set-ups. The main achieved results will be reviewed with particular emphasis to the obtained results on Dark Matter investigations, comparisons and plans.