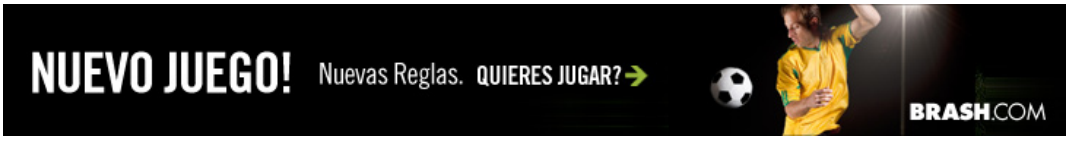

Finding The Island Of Stability In Super-Heavy Elements

September 19, 2012

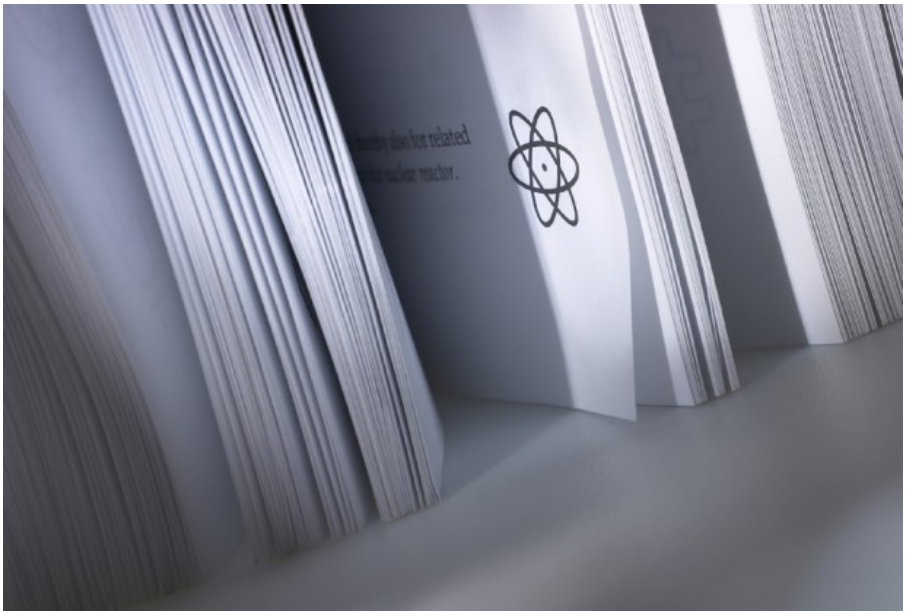

Image Credit: Photos.com

April Flowers for redOrbit.com – Your Universe Online

An international group of researchers, led by the University of Granada , has measured the effects of layers on super-heavy elements, providing useful data on the nuclear structure of these as yet undiscovered elements in nature.

The results, reported in Science , might prove useful in locating the "Island of Stability."

The team measured the isotopes of nobelium (No) and lawrencium (Lr) using a particle accelerator at the GSI Helmholtz Centre for Heavy Ion Research .

The Island of Stability is a theory in nuclear physics, which describes a set of as yet undiscovered isotopes of transuranium elements. These elements are theorized to be much more stable than others, with expected half-lives of at least minutes or days, as compared to seconds, with some expecting half-lives of millions of years.

All elements with an atomic number above 82 (lead) are unstable, and the "stability" (half-life of the longest-lived known isotope) of elements generally decreases with rising atomic numbers from the relatively stable uranium (92) upwards to the heaviest known element: 118. It increases very slightly in the range of elements 110 to 113, hypothesized to be at the beginning of the Island of Stability.

Super-heavy elements are those with an atomic number greater than 103. These elements are not "natural," they are created in a nuclear physics lab through the bombardment of elements in a particle accelerator. Super-heavy elements are created in atomic scale quantities, and no method of mass creation has yet been found. There are, however, predictive theories that claim a group of stable super-heavy elements exists in the Island of Stability range.

The stability of super-heavy elements is caused by a layer effect in the atomic nucleus. Protons and neutrons in the nucleus are arranged in layers, with some "magic layers" being very strongly bound, resulting in extremely stable elements. Without this bonding, super-heavy elements would immediately disintegrate due to Coulumb repulsion (the repulsive force between two positive or two negative charges) among protons.

The University of Granada is developing a quantum sensor, a unique device for measuring the greatest mass of nuclei ever measured. This device will be integrated into the GSI's accelerator in Germany, in the SHIPTRAP facilities.

The development of this measuring device (which started in November 2011) has been enabled by a grant of 1.5

Related Articles

- CERN To Reveal Higgs Boson Findings July 4
- Mapping The Nuclear Landscape
- Aerosol Structures Exposed By X-ray vision
- Potential Cracks In The Standard Model Of Particle Physics
- Getting Close To God (Particle)
- Stripping Gold From AFM Probes Allows Better Measurement Of Picoscale Forces
- Custom Designed And Built Mesoscopic Structures Make For Faster, Cheaper Gas And Liquid Separation
- Snow On Mars Size Of Red Blood Cells
- 'Graphene' A Tunable Plasmonic Medium
- Laser Frequency Comb Helps Evaluate Novel Biomedical Decontamination Method

Related Images

- G21.5-0.9
- M87 Jet
- Noril'sk, Northeast Siberia
- Searching for Primordial Antimatter
- This image shows one of the first transition metal complexes known to possess a ...
- Pictured is a tiny, hollow iridium wire
- Black Sea Phytoplankton
- Mars Curiosity Arm
- Mars Curiosity Arm
- Mars Curiosity Blasts Ground
- Mars Curiosity Extended Arm
- Mars Curiosity Instrument

Related Videos

- Breakthrough: RHIC Explores Matter at the...
- Particle Engulfment and PEP Experiment
- Exercise Protects the Brain from Decay
- The Daily Orbit: Russia's Biggest Secret...
- Too Much Iodine Can Harm Babies
- Breakthrough: RHIC Explores Matter at the...
- Science of Speed - Grip
- Animation Of Black Hole Swallowing Star
- Don't Substitute Your Pediatrician with...

million Euros, one of the highest grants ever awarded to the University of Granada for a specific project. The European Research Council awarded this grant to Professor Daniel Rodríguez in 2011 within the topic framework "Fundamental Constituents of Matter"

Source: April Flowers for redOrbit.com - Your Universe Online

Topics: Particle physics, Chemistry, Physics, Technology Internet, Transition metals, Actinides, Island of stability, Transuranium element, Transactinide element, Lawrencium, Nuclear physics, Chemical elements, Synthetic elements, University of Granada

Recommended For You

Protocols Were Disregarded By Clovis Impact Theory Challengers

No Direct Evidence Linking Corn Syrup And Obesity: Rippe Lifestyle Institute

Biology Notes Help Recreate Sound Of Times Past

Russia Reveals Diamond-Rich Prehistoric Asteroid Crater

Feathers Were Used By Neanderthals For Decorative Ornaments And Jewelry

Icy Particles Of Space May Have Been The Ingredients For Life On Earth

Quasars Lighting The Way For Mapping The Universe

Future Ground Stations Could Be Made Up Of Alien Dirt

Wave Interactions May Explain Why Some Tsunamis Are So Powerful

Combination HPV Tests Better Than Viral DNA Test Alone For Detecting Certain Cancers

[?]

Evolastin: Look 10 Years Younger Without...
Morpheus Tether Test Number 20
Puckering Effect
Concern About Mercury in Dental Fillings...

Related Reference Library

Physics
Physics (Main)
WIMP
Analyst
Synthetic Metals
Chemical Society Reviews
Van Allen Radiation Belt
Incoming Solar Radiation Impacts By...
Physics
International Journal of Robotics...
Journal of the Association for...
Solar Physics
Copper
Hafnium
Pyrolusite

Most Recent Blogs

An Inconvenient Truth
My Texas Brigades Experience (Part IV)
The Next And Future Car Tech: What's Happening And Why (Part 2)
Puppy Love
Big Story Weather – September 19, 2012
Samsung's New Phone
Taking Care of Business (Part 1)
Carrots Are Yummy, Too
Conquer Tasks With Any.DO On Android
Africa's Garden Of Eden

Post a new comment

Login

Post

0 Comments

RSS | Subscribe