*Article 3*

**New Element Set to Join the Periodic Table:**

**Scientists confirm that the super-heavy element 117 does exist**

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The heaviest element yet found is one step closer to joining the periodic table. That’s thanks to an international team of scientists at the GSI Helmholtz Centre for Heavy Ion Research in Darmstadt, Germany. They followed up research in 2010 by US and Russian scientists to confirm the so-called element 117, and in so doing they have taken physicists closer to the ‘holy grail’ of modern atomic physics.

An international team of scientists has confirmed the discovery of an element provisionally called element 117. It is the heaviest element to be confirmed on the periodic table so far. Although element 117 was first spotted four years ago, its discovery could not be confirmed until it had been independently verified, which has now been done.

The next step is for the International Union of Pure and Applied Chemistry (IUPAC) to accept the confirmation. This will then allow a name to be chosen and, ultimately, for the element to be added to the periodic table. The element currently has a temporary name of ununseptium, which translates as one (un) one (un) seven (sept) or 117, its atomic number. The atomic number is the number of protons found in the nucleus of an atom.

Lighter elements have less, heavier elements have more – hydrogen, for example, has one proton and thus an atomic number of one, making it the lightest element. Heavier elements on the periodic table have been theorized but proving their existence has been a challenge.

To do so, scientists often smash two existing elements together in the hope of creating new elements as a by-product. In this instance berkelium, atomic number 97, was hit with calcium ions, atomic number 20, creating element 117. Elements of this size, however, are highly unstable. This is why their discovery is difficult, as they often decay almost instantly.

In this instance the four atoms of element 117 that were created decayed into elements 115 and 113 in a matter of milliseconds, but remained stable long enough for scientists to grab a glimpse of them. The confirmation brings scientists closer to the 'holy grail' of atomic physics of finding stable superheavy elements.

Elements beyond atomic number 104 are called superheavy elements, but so far all have been found to have short half-lives, which is their rate of decay. However, it has been theorized that eventually there will be an ‘island of stability’ in the periodic table. This will be a superheavy element, or perhaps several, with longer lives and more stable atoms. The confirmation of element 117 brings scientists closer to this ‘holy grail’ but does not confirm its existence just yet.

‘This is of paramount importance as even longer-lived isotopes are predicted to exist in a region of enhanced nuclear stability,’ explains Dr. Christoph Düllmann from the Institute for Nuclear Chemistry in Mainz, Germany who led the team that made the confirmation of element 117.

Professor Horst Stöcker, Scientific Director of GSI, adds: ‘The successful experiments on element 117 are an important step on the path to the production and detection of elements situated on the “island of stability” of superheavy elements.’

***Questions:***

1. What is the temporary name of element 117?
2. What does the atomic number represent?
3. Which element is the lightest? Why is it the lightest?
4. How was element 117 created?
5. Why is the discovery of elements like 117 difficult?