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## 4. New Isotope of Uranium

### Why in News?

- Recently, In pursuit of a ‘magic number’, Physicists in Japan have discovered a new isotope of uranium with atomic number 92 and mass number 241.

### Highlights

- The researchers accelerated uranium-238 nuclei into plutonium-198 nuclei at the KEK Isotope Separation System (KISS). In a process called multinucleon transfer, the two isotopes exchanged protons and neutrons.
- The resulting nuclear fragments contained different isotopes.
- The team used time-of-flight mass spectrometry to measure the mass of each nucleus.
- It was identified as uranium-241 and measured the mass of its nucleus. Theoretical calculations suggest that this new isotope could have a half-life of 40 minutes.
- This discovery is the first of its kind since 1979 due to the extreme difficulty of synthesising a nuclide in this region by general reaction.
- This finding is significant in refining our understanding of nuclear physics and has implications in designing nuclear power plants and models of exploding stars.
- Measuring the mass of uranium and its neighbourhood elements yields essential nuclear information to understand the synthesis of such heavy elements in explosive astronomical events.
- This new approach using multinucleon transfer reaction and KISS is expected to lead to the discovery of more neutron-rich actinide nuclides, elucidating the stability of nuclides and the process of astronomical nucleosynthesis