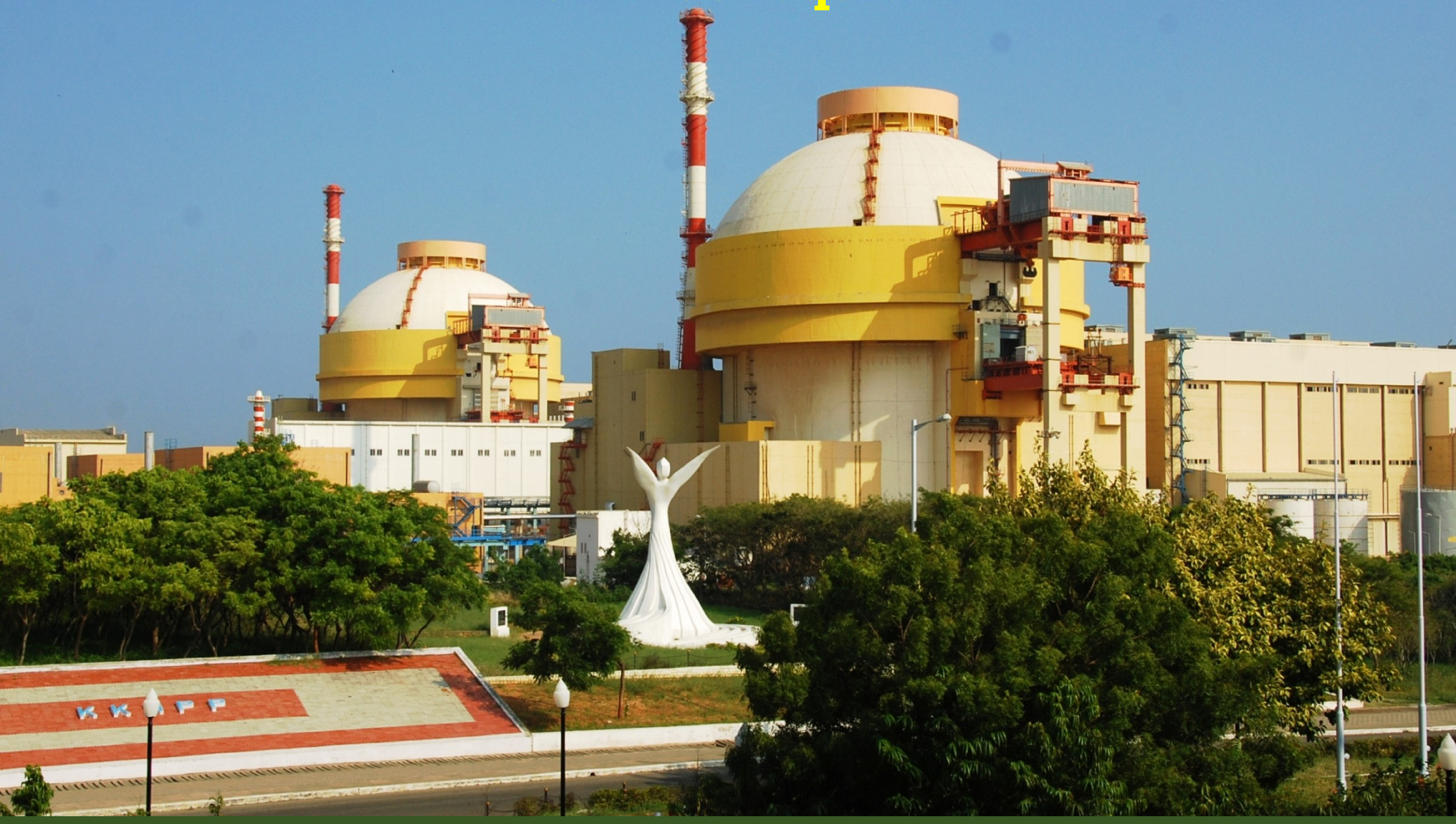
Tata Institute of Fundamental Research

ASET Colloquium



Plutonium: A Unique Element

Dr. P.R. Vasudeva Rao

Former Vice Chancellor, HBNI and former Director, IGCAR

Among the actinide elements, plutonium is a unique element, with respect to its thermochemical behaviour, solution chemistry, and its radioactive properties. The efforts behind its discovery and its first production on a kg scale form a fascinating part of science history. In the Indian context, plutonium plays a central role in the atomic energy program. Fast reactors with closed fuel cycle, that utilise the plutonium generated in the thermal reactors and breed additional plutonium, constitute a vital strategy for the growth of nuclear power in the country. Thorium being a “fertile” element, needs to be converted to uranium-233 in fast reactors; therefore, fast reactor technology is essential for the country’s plans to utilise its large reserves of thorium for energy generation. Plutonium is thus, an enabler for the thorium utilisation. It is a matter of pride that India has mastered the technology for recovery of plutonium from irradiated uranium-based fuels, fabrication of plutonium-based fuels, and their deployment in fast reactors. The talk will present an overview covering the exciting history of plutonium, the challenges in developing a plutonium-based fuel cycle, and India's achievements in this domain.

Dr. P.R. Vasudeva Rao is the former Vice Chancellor of Homi Bhabha National Institute (HBNI). He is a specialist in actinide chemistry and particularly the chemistry of the nuclear fuel cycle. Dr. Rao graduated from the 16th batch of BARC Training School and joined the Radiochemistry Division of BARC. He obtained his Ph.D degree in Chemistry from the University of Bombay in 1979 for his work on the chemistry of actinide elements. He shifted to Indira Gandhi Centre for Atomic Research (IGCAR) at Kalpakkam in 1978 and rose to the position of Director, IGCAR, and superannuated in August 2015. Dr. Rao was responsible for the development of several facilities for R&D on fast reactor fuel cycle at IGCAR including a facility for the fabrication of sodium-bonded metallic fuel pins, a hot cell facility for recovery of minor actinides from high-level liquid waste and production of enriched elemental boron from boric acid. He has over 300 publications in peer-reviewed international journals. Dr. Rao has guided 15 students toward their Ph.D degrees. He is the recipient of several awards such as the MRSI medal, the CRSI Silver medal, and the Indian Nuclear Society award, and is an elected Fellow of INAE and NASI.

Friday, 17th March 2023 at 4 p.m. in AG-66, TIFR Mumbai

YouTube Live Link: https://youtube.com/live/CkLMSv5Ktx0?feature=share