

EMERGING LANDSCAPE OF ACCELERATOR SCIENCE AND TECHNOLOGY

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Abstract:

John Cockcroft's splitting of the atom and Ernest Lawrence's invention of the cyclotron in the first half of the twentieth century ushered in the grand era of ever higher energy particle accelerators to probe deeper into matter. It also forged a link, bonding scientific discovery with technological innovation that continues today in the twenty first century. In the second half of the twentieth century, we witnessed the emergence of the photon and neutron sciences driven by accelerators built-by-design producing tailored and ultra-bright pulses of bright photons and neutrons to probe structure and function of

matter from aggregate to individual molecular and atomic scales in unexplored territories in material and life sciences. As we enter the twenty first century, the race for ever higher energies, brightness and luminosity to probe atto-metric and atto-second domains of the ultra-small structures and ultra-fast processes continues. We give a glimpse of the recent developments and innovations in the conception, production and control of charged particle beams in the service of scientific society.