



July 15, 2009

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Strongest beam in the world enables scientists to explore laws governing all matter in the universe

A beam 100 times stronger than any other in the world has allowed an international research group headed by the researchers from the RIKEN Nishina Center for Accelerator-Based Science (RNC) to demonstrate in only eight hours what it would take other scientists more than six months to achieve. It is the first big experimental achievement using the Radioactive Isotope Beam Factory (RIBF) at RNC.

The team show that a neutron rich isotope of neon has a highly deformed shape and therefore lies in a mysterious region of the nuclear chart.

Their beam fires at 60 per cent the speed of light and has enabled the exploration of this region where standard laws of nuclear physics break down. Populated by highly unstable neutron-rich isotopes, this region, known as the 'Island of Inversion', is thought to offer clues about underlying laws governing all matter in the universe.

The neutron-rich isotope of neon-32 was produced by accelerating calcium-48 in a powerful superconducting ring cyclotron at RNC. It has a highly deformed shape, confirming that it lies within the Island of Inversion.

Deformation was determined via the measurement of excitation levels, by exposing a carbon target to a high-intensity beam of Neon-32 and measuring nuclear reaction products and de-excitation gamma rays.

In the future, the power of the RIBF high-intensity beams promises to generate exciting new results on unstable neutron-rich nuclear isotopes, broadening our understanding of nuclear physics.

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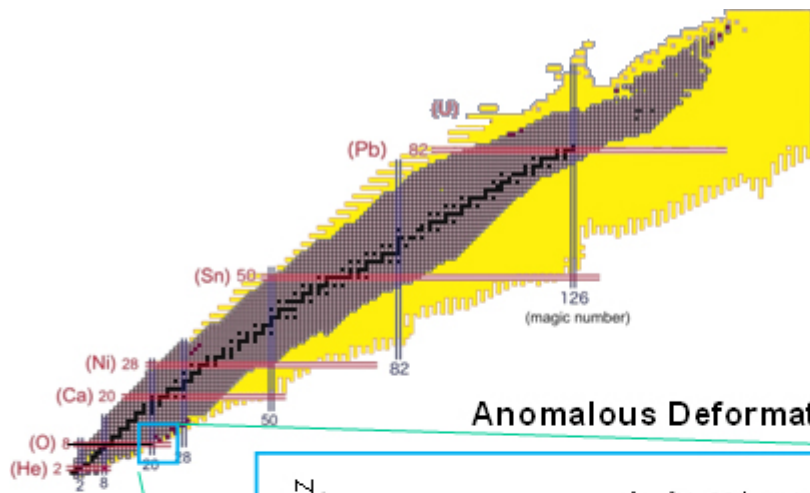
Ms. Saeko Okada (PI officer)

Global Relations Office

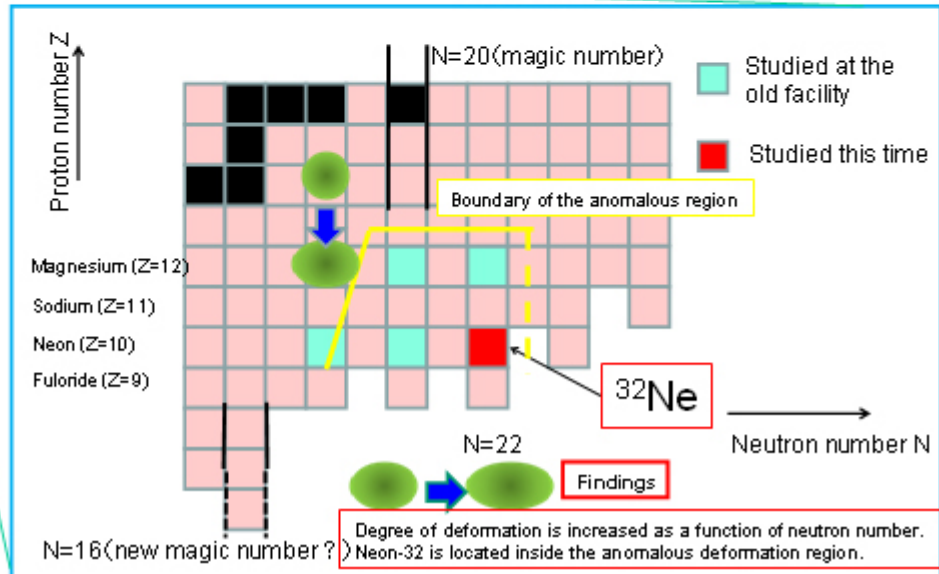
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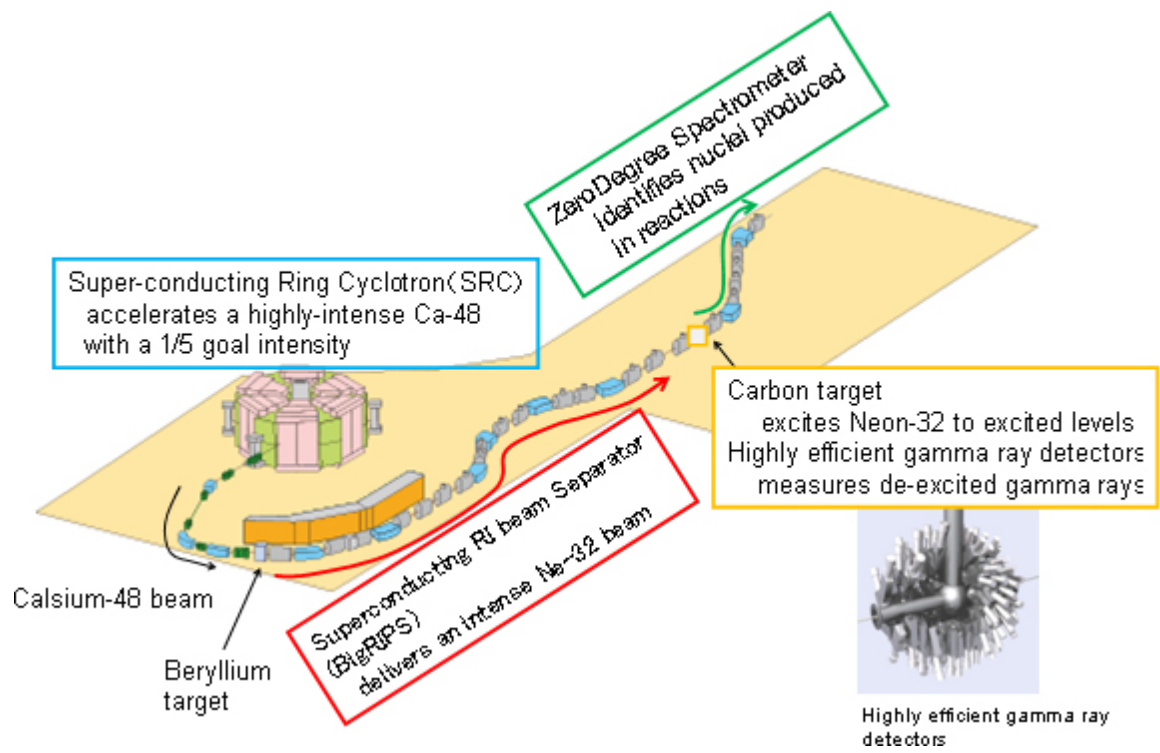
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Anomalous Deformation Region





Highly efficient gamma ray detectors

