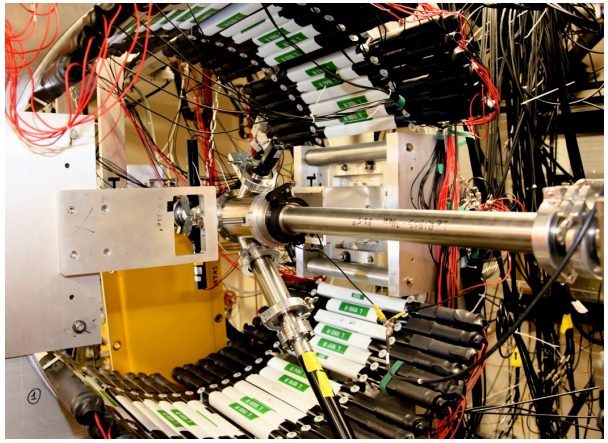
Data from the Versatile Array of Neutron Detectors at Low Energy (VANDLE) will impact modeling of processes occurring in neutron-rich environments

- The energies of beta-delayed neutrons emitted from 25 isotopes between Cu and Sb have been measured for the first time
- The data indicate some isotopes have strong feeding to high-lying states that emit high energy neutrons while others have broad distributions of energies
- Beta-delayed neutron emission affects the neutron density and energy release in nuclear reactors as well as the final isotopic distribution in the nuclear fuel
- Beta-delayed neutrons also impact the pathways of the rapid-neutron capture process, particularly in its cooling phase, influencing final isotopic distributions
- By directly measuring the beta-delayed neutron energy the locations of unbound states fed directly by beta decay are known
- Localized feeding, as seen in ^{84}Ga, may indicate nuclear structure effects that theoretical modeling can identify
- VANDLE consisted of 48 plastic scintillators and has energy resolution of 120 keV for 1 MeV neutrons and an energy threshold of 100 keV



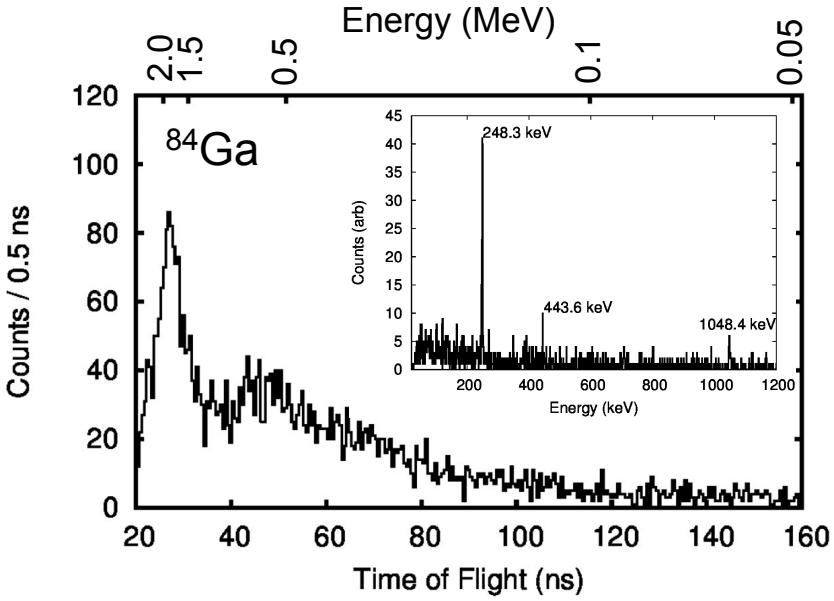


Figure: (Top) A photograph (exposure adjusted) of VANDLE located at the HRIBF. (Bottom) The beta-delayed neutron spectrum is shown for ^{84}Ga. Note the prominent high neutron energy peak for ^{84}Ga. The inset is the gamma-ray spectrum correlated in time by neutrons emitted from ^{84}Ga.

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