## $^{9}$Be($^{48}$Ca,$^{35}$Na) 2013StZY,2022Cr03

2013StZY: $^{35}$Na was produced via the projectile fragmentation of a 345-MeV/nucleon, 70-pnA $^{48}Ca^{20+}$ primary beam from the linear accelerator RILAC and the four cyclotrons RRC, fRC, IRC, and SRC at RIKEN impinging on an 15-mm-thick $^{9}$Be target. The secondary cocktail beam was selected by the BigRIPS separator and the zero-degree spectrometer (ZDS) using the B$\rho$-$\Delta$E-ToF method, and implanted into the Cylindrical Active Implantation Target for Exotic Nuclei (CAITEN) consisting of a segmented movable hollow-cylindrical-shaped plastic scintillator and a stationary ring of 24 position-sensitive photomultiplier tubes (PSPMTs) arranged on a ring inside the scintillator at the height of the beam line. To reduce background buildup, the scintillator barrel was fastly rotated and slowly moved axially in vertical direction, resulting in a helix-shaped motion. $\beta$ particles were detected by the CAITEN and $\gamma$ rays were detected using three HPGe clover detectors. Measured E$\gamma$, $\beta\gamma$-coin, and implant-$\beta$ correlation, and deduced the $T_{1/2}$ of $^{35}$Na. Comparisons with QRPA and shell-model calculations.

2022Cr03: $^{35}$Na was produced via the projectile fragmentation of a 172.3-MeV/nucleon, 120-pnA $^{48}Ca^{20+}$ primary beam from the FRIB linac impinging on an 8.89-mm-thick $^{9}$Be target. The secondary cocktail beam centered around $^{42}$Si was selected by the ARIS separator and implanted into a 5-mm-thick YSO segmented scintillator sandwiched between two plastic scintillator veto detectors. Surrounding the implantation array were 11 HPGe clover detectors and 15 fast-timing $LaBr_3$ detectors, and the VANDLE array of 88 neutron detectors. Two Si PIN detectors and plastic scintillator were placed 1.5 m upstream in the last diagnostic detector box of the beamline. Ions were identified event by event by energy loss in the upstream PIN detector (Z determination) and time of flight between a plastic timing scintillator at the start of stage 3 of ARIS and the timing scintillator in the diagnostic detector box (A/Q determination) over a flight path of 33.5 m. Measured implant-$\beta$ correlation and deduced $T_{1/2}$ of $^{35}$Na. Comparisons with QRPA and shell-model calculations.

### $^{35}$Na Levels

| E(level) | $T_{1/2}$ | Comments |
|---|---|---|
| 0.0 | 2.1 ms *4* | $T_{1/2}$: From the Adopted Levels of $^{35}$Na. $T_{1/2}$=2.4 ms *3* (stat) *2* (syst) (2022Cr03, implant-$\beta$ correlation). $T_{1/2}$=2.4 ms *3* (stat) *6* (syst) (2013StZY, implant-$\beta$ correlation). |