**Why is MARS useful?**


MARS measures the ANC for $^{12}\text{N} \rightarrow ^{13}\text{C} + p$, and the S-factor and reaction rate are calculated.

**How Does MARS Work?**

MARS works by inverse kinematics and provides the following optical elements: Dipoles (3), Quadrupoles (5), Sextupoles (2), a Velocity Filter and Filtration Slits (4).

**My Research on MARS**

The Calibration of the MARS Detector used a five finger mask with each finger spaced 10 mm apart. After calibration the resolution of the detector at FWHM was 0.96 mm.

MARS data improves on S-factor measured by GANIL, showing a higher reaction rate than previously determined.

**Beta Decay Application:**

Uses Purified Radioactive Beams to determine half-lives and branching ratios.

The half-life and branching ratio for $^{62}\text{Ga}$ are determined to improve the value of the weak coupling constant for up-down quarks.

MARS was partially disassembled in early March 2004 so repairs could be made to a cooling coil in the Velocity Filter’s magnet.

Each element of MARS after Dipole-2 had to be removed. After repairs, each element was put back in place and realigned using a transit system and previously aligned points.

After focusing, the final beam consists of more than 99% of our desired nucleus, $^{13}\text{N}$.

MARS was partially disassembled in early March 2004 so repairs could be made to a cooling coil in the Velocity Filter’s magnet.

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