A New Precision Measurement of the Lifetime of $^{19}$Ne LEAH BROUSSARD, Duke U & TUNL, ROBERT PATTIE, HENNING BACK, ALBERT YOUNG, NCSU & TUNL, UMANKANT DAMMALAPATI, SUBHADEEP DE, PETER DENDOOVEN, OTTO DERMOIS, LEO HUISMAN, KLAUS JUNGMANN, ARAN MOL, C. GERCO ONDERWATER, ANDREY ROGACHEVSKIY, MOSLEM SOHANI, EMIL TRAYKOV, LORENZ WILLMANN, HANS WILSCHUT, KVI — The mixed $\frac{1}{2}^+ \rightarrow \frac{1}{2}^+$ decay of $^{19}$Ne is an important system for studies of the weak interaction. A measurement of the lifetime of this decay at the $10^{-4}$ level combined with the measured value of the $\beta$-asymmetry enables a determination of $V_{ud}$ that rivals the precision obtained from $0^+ \rightarrow 0^+$ superallowed Fermi beta decays. The lifetime is currently known to a precision of about 0.08%, and by utilizing the unique capabilities of the Trapped Radioactive Isotopes: $\mu$icro-laboratories for fundamental Physics (TRI$\mu$P) facility at the Kernfysisch Versneller Instituut (KVI), we can improve this precision by up to a factor of three. We describe recent progress towards a high-precision lifetime measurement and present preliminary results.

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