The ^{18}F(p,α)^{15}O reaction and ^{18}F abundance in novae

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The largest nuclear physics uncertainty in studies of gamma-ray emission from novae arises from the ^{18}F(p,α)^{15}O reaction rate that affects the abundance of ^{18}F. Measurements have been made of the ^{18}F(p,p)^{18}F and ^{18}F(p,α)^{15}O reaction differential cross sections in the energy range $0.5 \leq E_{cm} \leq 1.6$ MeV. Several resonances have been observed in both measurements, with simultaneous R-matrix fits used to determine the properties of corresponding states in ^{19}Ne. A new astrophysical reaction rate for the ^{18}F(p,α)^{15}O reaction has been calculated based on these results and included in hydrodynamic simulations of classical novae. This leads to significantly greater production of ^{18}F in novae than previously thought.