Abstract Submitted
for the APR14 Meeting of
The American Physical Society

Nuclear Mixing Meters for Classical Novae[1] K.J. KELLY, C. ILIADIS, L.N. DOWNEN, A.E. CHAMPAGNE, University of North Carolina at Chapel Hill and Triangle Universities Nuclear Laboratory, J. JOSÉ, Universitat Politècnica de Catalunya and Institut d'Estudis Espacials de Catalunya — Mass transfer from a main sequence star onto a white dwarf partner can lead to a thermonuclear runaway (TNR) followed by a violent mass expulsion episode known as a classical nova. Characteristics of novae depend upon evolutionary parameters such as the composition of matter undergoing the TNR and observations suggest mixing between accreted material (presumed to be of solar composition) and the underlying white dwarf prior to the TNR. Using results of models of oxygen-neon novae, the elemental abundance *ratios* ΣCNO/H, Ne/H, Mg/H, Al/H, and Si/H are found to be indicators of this mixing. The impact of nuclear physics uncertainties on these results was investigated through Monte Carlo post-processing calculations using T-ρ profiles for all mass zones as computed by the hydrodynamic models. Although ^{30}P$(p,\gamma)^{31}$S significantly affects the Si/H abundance ratio, overall the mixing meters are found to be robust against nuclear physics uncertainties. A comparison of our results with observations provides strong constraints for nova models.

[1]This work was supported in part by the US DOE, NSF, Spanish MICINN, E. U. FEDER funds, and the ESF EUROCORES Program EuroGENESIS

Keegan Kelly
University of North Carolina at Chapel Hill and
Triangle Universities Nuclear Laboratory

Date submitted: 10 Jan 2014 Electronic form version 1.4