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New Triple-α Reaction Rates from the Second $J^\pi = 2^+$ State in ^{12}C[1] W.R. ZIMMERMAN, M.W. AHMED, S.S. HENSHAW, I. MAZUMDAR, J.M. MUELLER, L.S. MYERS, M.H. SIKORA, S. STAVE, H.R. WELLER, TUNL, C. FRÖHLICH, NCSU, M. GAI, LNS at Avery Point — The second $J^\pi = 2^+$ state in ^{12}C, recently identified near 10 MeV in the ^{12}C(γ,α)^{8}Be reaction [1], can affect the triple-α reaction rates at high temperatures. These rates can determine the outcome of nucleosynthesis during supernovae and other explosive astrophysical scenarios. We present new high-temperature triple-α reaction rates calculated by including the 2^+ state near 10 MeV. Simulations of explosive nucleosynthesis which include the νp process are being performed to investigate the possible implication of these new rates on the production of heavy elements during core-collapse supernovae.

[1] W. R. Zimmerman *et al.*, Phys. Rev. Lett. **110**, 152502 (2013)

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William Zimmerman
TUNL

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