Abstract Submitted
for the GEC17 Meeting of
The American Physical Society

Transition rates and electron impact excitation rates for O III[1]
SWARAJ TAYAL, Clark Atlanta University, OLEG ZATSARINNY, Drake University — Transitions probabilities, electron excitation collision strengths and rate coefficients for a large number of O III lines have been calculated in the close-coupling approximation using the B-spline Breit-Pauli R-matrix method. The multiconfiguration Hartree-Fock method is employed for an accurate representation of the target wave functions. The close-coupling expansion contains 202 O III fine-structure levels comprising the 5 levels of the ground configuration $2s^22p^2$, 10 levels of first excited configuration $2s2p^3$, 4 levels of the $2p^4$ configuration, all levels for the 2p excitation to the $2s^22p3s$, 3p, 3d, 4s, 4p, 4d, 4f, 5s configurations, and all levels for the 2s excitation to the $2s2p^33s$,3p,3d configurations. The collision strengths have been calculated for the 20302 transitions between all 202 fine-structure levels. There is an overall good agreement with the recent R-matrix calculations by Storey et al. (2014) for the transitions between first 5 levels of the ground $2s^22p^2$ configuration, but significant discrepancies have been found with Palay et al. (2012) for transitions to the $2s^22p^2$ $^1S_0$ level. A fair agreement is found with the LS-coupling calculation of Aggarwal and Keenan (1999) for transitions to the $2s^22pnl$ states, with average discrepancies of about 30%. However, rate coefficients differ by up to a factor of 10 for some transitions. The present calculations provide data sets that should allow a more detailed treatment of the available measured spectra from different space observatories. [1] P. Storey et al. 2014 MNRAS **441** 3028 [2] E. Palay et al. 2012 MNRAS **423** L35 [3] K. Aggarwal and F. Keenan 1999 ApJS **123** 311

[1]This research work is supported by the National Science Foundation grant number 1714159.

Oleg Zatsarinny
Drake University

Date submitted: 15 Jun 2017 Electronic form version 1.4