Abstract Submitted
for the DAMOP13 Meeting of
The American Physical Society

Magnetic dipole decay rates and $1/Z$ expansions for the $1s2s\ ^3S_1$ state of helium and heliumlike ions[1] LAUREN MOFFATT, G.W.F. DRAKE, University of Windsor — The lifetime of the metastable $1s2s\ ^3S_1$ state of helium is determined by relativistic magnetic dipole (M1) transitions to the ground state, giving an extraordinarily long lifetime of 7859 s. The M1 transition rates are evaluated numerically using large basis set variational calculations in Hylleraas coordinates for all the He-like ions up to Ar^{+16}. The coefficients of a $1/Z$ expansion, based on the results from the variational calculation, are evaluated up to ninth order, with the zeroth and first order coefficients being determined analytically. This $1/Z$ expansion is used to evaluate the lowest-order M1 transition rates for heliumlike ions along the isoelectronic sequence from K^{+17} to Fm^{+98}. The results for helium are compared with other theory [1], and experimental measurements by Moos and Woodsworth [2] and Hodgman [3], and the ionic results are compared with electron beam ion trap measurements by Trabert [4].

[1] G. Lach and K. Pachucki, Phys. Rev. A **64**, 042510 (2001).
[2] H. W. Moos and J. R. Woodsworth, Phys. Rev. A **12**, 6 (1975).
[3] S.S. Hodgman *et al.*, Phys. Rev. Lett. **103** 053002 (2009).
[4] E. Trabert, Can. J. Phys. **86**, 73 (2010).

[1]Research supported by NSERC and by SHARCNET.

Gordon Drake
University of Windsor

Date submitted: 28 Jan 2013 Electronic form version 1.4