Abstract Submitted
for the DAMOP05 Meeting of
The American Physical Society

Calculations of autodetachment lifetimes of metastable states of Ba^- and Eu^{-1} STEVEN M. O'MALLEY, DONALD R. BECK, Michigan Technological University — The metastable $5d6s6p\ J = 9/2$ state of Ba^-, which decays by autodetachment to $6s^2\epsilon h$, has been found to be long lived with an estimated lifetime greater than 1 ms [2] [3]. For the bound state, we have extended our basis set to include orbitals up to $l = 6$ due to the importance of $\langle nlvl'|H|nl\epsilon h\rangle$ contributions to the energy width. We have also opened the $5p$ subshell to provide core-valence correlation to ensure proper mixing of the important $5d^2\epsilon h$ and $6p^2\epsilon h$ configurations in the continuum state. As we approach completion of this calculation, current results suggest an auto detachment lifetime greater than 10 ms. The analogous, and more computationally challenging, $4f^7 5d6s6p\ J = 8$ state in Eu^-, which decays by autodetachment to $4f^7 6s^2\epsilon h$, has been found to be similarly long lived.

[1]This work is supported by National Science Foundation grant no: PHY-0097111.
[2]V. V. Petrunin *et al.*, Phys. Rev. Lett. **75**, 1911 (1995).
[3]T. Andersen *et al.*, J. Phys. B **30**, 3317 (1997).

Steven O'Malley
Michigan Technological University

Date submitted: 27 Jan 2005 Electronic form version 1.4