The Ruby Phosphorescence Laboratory: Measuring the $^2E$-Term Room-Temperature Lifetime of Cr$^{3+}$.\textsuperscript{1} ANTHONY CALAMAI, J. HINDS, W. DULANEY, T. DULA, J. BURRIS, B. HESTER, Appalachian State Univ — Many existing advanced laboratory experiences associated with the metastable $^2E$ term of Cr$^{3+}$ in ruby, which gives rise to the R-lines at 692.7 and 694.3 nm, focus on a room-temperature measurement of the radiative lifetime of the $^2E$ term. These projects typically use commercially available ruby spheres for which the manufacturer(s) only state an $\sim 2$-percent chromium concentration. The uncertainty in Cr$^{3+}$ concentration represents one source of systematic error for this laboratory experience. In our local work developing a cost-effective laboratory experience in atomic phosphoresce, we noted a lack of consistency in the literature for the lifetime of the Cr$^{3+}$ $^2E$ term. We present our results and corrections for systematic issues that make this project a more rewarding experience for students. Our result for the room-temperature radiative-lifetime for the $^2E$ term is $3.3 \pm 0.1$ ms; which, unlike some more recent reports (e.g. \cite{1}), compares favorably with that of Nelson and Sturge \cite{2}. \cite{1} Espositi, C.D. and Bizzocchi, L., J. Chem. Ed., V84, 1316, (2007). \cite{2} Nelson, D.F. and Sturge, M.D., Phys. Rev., V137 4A, A1117, (1965).

\textsuperscript{1}We thank the NASA/NC Space Grant for student salary support.