Classical calculation of the lifetimes and branching ratios for radiative decays of hydrogenic atoms M.W. HORBATSCH, E.A. HESSELS, M. HORBATSCH, York University — The correspondence principle for atomic radiation is extended to all hydrogenic states n and $l > 0$. Lifetimes and branching ratios are obtained using analytic calculations of the classical radiated spectrum for the elliptical orbit corresponding to a particular quantum state. The polarization of the radiation is used to separate out the angular momentum decreasing and increasing transitions. The lifetimes show excellent agreement with quantum mechanics for all principal quantum numbers n and $l \geq 1$ (e.g. < 100 ppm for $l \geq 30$, $< 0.1\%$ for $l \geq 9$, $< 1\%$ for $l \geq 3$). The calculated branching ratios are in reasonable agreement with quantum mechanics for all n', l', n and $l \geq 1$.

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