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H α , H β , and Ly α fluorescence from the photodissociation of H $_2$ and D $_2$ ¹ T.J. GAY, J.R. MACHACEK, University of Nebraska, J.E. FURST, University of Newcastle-Ourimbah, A.L.D. KILCOYNE, J.D. BOZEK, ALS/LBNL, H. GOULD, LBNL, M.S. LUBELL, CC-CUNY, K.W. MCLAUGHLIN, Loras College — We have measured the intensity, corrected for polarization, of H α (656 nm), H β (486 nm), and Ly α (122 nm) fluorescence from the photodissociation of H $_2$ and D $_2$ by linearly-polarized photons with energies between 25 and 150 eV. We observe a low-energy maximum in the intensities for all three transitions between 35 and 40 eV, due to excitation of doubly-excited molecular states. A second shoulder or secondary maximum is attributed to the direct production of excited H $_2^+$ states which subsequently dissociate into the excited atoms. This second maximum is in qualitative agreement with the H α results of Garcia *et al.* [1]. The effects of cascading and the size of the visible collision volume on these data is discussed. [1] Garcia *et al.*, J. Phys. B **39**, 205 (2006).

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