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Microwave enhancement of dielectronic recombination from a continuum of finite bandwidth EDWARD SHUMAN, JIRAKAN NUNKAEW, TOM GALLAGHER, University of Virginia — Dielectronic recombination (DR) is the recombination of an energetic electron and an ion via autoionizing Rydberg states lying below an excited state of the ion. We have examined the relative effects of microwave fields on DR from a continuum of finite bandwidth (CFB) with incoming electrons with different angular momenta. By studying DR from a CFB we can restrict the angular momentum of the intermediate state to a single value of ℓ. Specifically, we have examined the relative effects of 18-26 GHz microwave fields on DR from two CFB's, the Ba $6p_{3/2}$ $11d$ and $6p_{3/2}$ $8g$ states. We have determined that lower microwave fields are required to enhance DR when the incoming electrons are g rather than d electrons. This observation is consistent with the fact that in Ba, the ng energies are almost hydrogenic, with quantum defects of 0.05, whereas the nd electrons have quantum defects of 0.25. We have also observed a shift in the binding energy at which the resonant enhancement occurs for the ng states. For low microwave fields, the enhancement occurs at approximately the right binding energy to match the resonance requirement, $\omega = 1/n^3$, but at higher fields the enhancement shifts quadratically with the microwave field to higher binding energy.

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