ANALYSIS OF THREE-BODY FORMATION RATES COEFFICIENTS OF Hg*, Hg_2^*, AND Hg_3^* VIA PHOTOEXCITATION OF Hg VAPOR

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Decay rates of 335 nm emission from Hg_2^* and 485 nm emission from Hg_3^* were recorded under 266 nm photoexciation. A previously unobserved turning point in the decay rates with respect to Hg number density curve was recorded. A new rate equation model was built to reveal the three-body formation rates coefficients of Hg^*, Hg_2^*, and Hg_3^* by matching the simulated decay rates with Hg number density curves with experimental recorded ones:

$Hg^* + Hg + Hg \rightarrow Hg_2^* + Hg$

$Hg_2^* + Hg + Hg \rightarrow Hg_3^* + Hg$

$Hg_3^* + Hg + Hg \rightarrow Hg_4^* + Hg$

Pump and probe experiments with 266 nm and tunable blue laser were also conducted and suppression of both 335 nm and 485 nm emission at different probe laser wavelength were recorded. The delay between occurring time of 335 nm and 485 nm was observed. The suppression intensity of the two cases were also analyzed and compared.