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Configuration-interaction many-body perturbation theory transition probabilities of La I and U II[1] DMYTRO FILIN, IGOR SAVUKOV, JAMES COLGAN, Los Alamos National Laboratory — Accurate La I transition probabilities are calculated using configuration-interaction many-body perturbation theory (CI-MBPT) with 10 adjustable parameters, following the method of ref [1]. Comparison is given for energies, g-factors, and transition probabilities and lifetimes with experimental results and with other theories. Close agreement with experiment is observed for most transitions. In some cases, when two states are very close to each other, strong mixing occurs, which was difficult to predict theoretically by only energy optimization. To overcome this, we introduce a mixing angle adjustment that significantly improves the accuracy of the results. This theoretical approach can be extended to other more complex atoms. We have also applied CI-MBPT theory to calculations of energies, g-factors, and transition probabilities for the more complicated U II system. We will report the results of calculations at the conference
1. IM Savukov, PM Anisimov, Physical Review A 99 (3), 032507 (2019).

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