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Convergence of Atomic Data for Kilonova Modeling

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In recent years a lot of work has been dedicated to the analysis of multi-messenger signals from binary neutron star mergers. The electromagnetic signal, known as a kilonova, is powered by the radioactive decay of synthesized r-process nuclei and provides a unique opportunity to probe the in-situ operation of the r-process. Kilonova spectra are modeled with the aim of identifying spectral signatures of particular elements, confirming their formation during the r-process in the merger ejecta. In this talk, I will present a set of detailed atomic data obtained from structure calculations for all elements up to uranium which we intend to use to model kilonova spectra. I will show the convergence behaviour of the atomic data and to determine its impact on quantities which are relevant for the spectral modeling such as partition functions and opacities. By this we obtain a measure for the accuracy of the data required for kilonova spectral modeling.

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