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Semi-classical treatment of photon cascades in nuclei

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A simple semi-classical treatment of photon cascades has been developed. The basic assumption is that a nucleus with a classical spin vector $\boldsymbol{J}$ can be represented by the maximally aligned quantum state $|J,M = J>$ with the quantization axis being the spin direction $\boldsymbol{J}/J$. It is furthermore assumed that a photon emission yields a daughter state of a similar form, $|J',M' = J'>$, but with its alignment direction having been modified as a consequence of the angular momentum recoil. The overall good quality of the treatment is illustrated for a variety of *E1* and *E2* two-photon cascades for which non-trivial angular correlations emerge. The method is suitable for use in nuclear fission simulation codes, making it possible to address photon-photon correlation observables quantitatively.

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Primary author: RANDRUP, Jorgen (Lawrence Berkeley National Laboratory)

Co-author: DOSSING, Thomas (Lawrence Berkeley National Laboratory)

Presenter: RANDRUP, Jorgen (Lawrence Berkeley National Laboratory)

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