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Hauser-Feshbach Analysis of Fast Neutron-Induced Reactions on Chlorine

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Neutron-induced reactions on chlorine isotopes have recently been analyzed in a Hauser-Feshbach framework at Los Alamos National Laboratory. Particular focus has been applied to the “fast” energy range above 100 keV, where these reactions become important for applications like CLYC detector characterization and the development of molten chloride fast reactors (MCFRs). However, challenges to applying a purely statistical analysis to this mass range have presented themselves in the form of cross section fluctuations and deviations due to low-mass structure. In this presentation these challenges and their current solutions will be highlighted, representing improved agreement with available data over the current databases. Comparison will also be made between ^{35}Cl and ^{37}Cl in terms of valence shell structure and compound system level density. Finally, extensions to nearby ^{39}K will be discussed with astrophysical implications.

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