

Abstract Submitted
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Nuclear Gamma-Ray Deexcitation Lines and Continuum from Accelerated-Particle Interactions in Solar Flares RONALD MURPHY, Naval Research Laboratory, BEN-ZION KOZLOVSKY, Tel Aviv University, JURGEN KIENER, Universite Paris-Sud, GERALD SHARE, University of Maryland — The gamma-ray deexcitation-line production code, developed originally by Ramaty, Kozlovsky and Lingenfelter (1979), has been the primary theoretical tool for analysis of solar-flare gamma-ray data. Analyses using this code have provided information about conditions in flaring magnetic loops, the abundances of the chromosphere where the gamma rays are produced, and the composition and spectrum of the flare-accelerated ions. We have improved its completeness and accuracy in three ways. (1) We use recent line-production cross-section measurements to both improve the included cross sections and to add new cross sections. (2) For the first time, we give a detailed evaluation of the unresolved-line continuum, consisting of all emission not accounted for by the explicit lines addressed by the code. Because adequate laboratory measurements for this emission are not available, the primary tool for this evaluation was the theoretical nuclear program TALYS. (3) We use TALYS to improve those line cross sections where available laboratory measurements are inadequate and to add new, unmeasured cross sections. We also summarize ambient and accelerated-ion composition results from recent analyses of solar-flare data using the improved calculations.

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