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A Model for the Coalescence of Abraded Nucleons in Heavy Charged Particle Collisions[1] WOUTER DE WET, LAWRENCE TOWNSEND, University of Tennessee, CHARLES WERNETH, NASA Langley Research Center, WILLIAM FORD, University of Tennessee — Accurate nuclear reaction models are required by the radiation transport codes used to predict the radiation field behind shielding in the space radiation environment. The resulting particle spectra and their corresponding biological response functions are used to estimate radiation risk to astronauts. Radiation transport codes use nuclear fragmentation models to describe the breakup of heavy charged particles in collisions with constituent nuclei of spacecraft and astronauts. The Relativistic Abrasion-Ablation and De-Excitation Fragmentation code, or RAADFRG, uses an abrasion-ablation reaction mechanism to calculate total and isotopic production cross sections of fragment species from a projectile nucleus. In this reaction mechanism, a fraction of nucleons, which sheared from the projectile nucleus during the abrasion step, coalesce to form various light ions. As with its predecessors, the Nuclear Fragmentation (NUCFRG) series, RAADFRG is being developed for implementation in NASA's deterministic High Charge (Z) and Energy radiation TRaNsport code, HZETRN. In this work, we derive the formalism used in RAADFRG to handle this process. Also, characterization of the model and its sensitivity to the coalescence radius parameterization are investigated.

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