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Numerical Model of a Spacecraft Shielding against High-Energy Particles ADRIAN SUN, Northrop Grumman, Redondo Beach, CA 90278, OLEG BATISHCHEV, MIT, Cambridge, MA 02139 — Galactic Cosmic Rays are composed of predominantly GeV protons and α-particles coming uniformly with $\sim$1 $(\mathrm{m}^2\ \mathrm{sr\ sec\ MeV/nucleon})^{-1}$ flux. Despite very low particle & power fluxes delivered, they pose a major continuous hazard for subjects, biological materials and sensitive equipment in space. A self-consistent adaptive kinetic model is being developed to simulate different strong magnetic, electrostatic and hybrid shielding schemes. The model includes relativistic transport of particles, calculation of internal electromagnetic fields, ambient and incidental plasma responses to the applied strong fields. Numerical method uses unstructured adaptive grids in 3D, enabling automatic capturing of important physical details of the shield and plasma. The numerical method applications using shared and distributed architectures will be discussed. Results of the kinetic simulations of a spacecraft shielding against high-energy particles and possible macro-particles will be presented.

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