GEANT4 simulation of APEX background radiation and shielding MADUKA M. KALUARACHCHI, GORDON D. CATES, University of Virginia, B. WOJTSEKHOWSKI, Thomas Jefferson National Accelerator Facility — The A$'$ Experiment (APEX), which is approved to run at the Thomas Jefferson National Accelerator Facility (JLab) Hall A, will search for a new vector boson that is hypothesized to be a possible force carrier that couples to dark matter. APEX results should be sensitive to the mass range of 65 MeV to 550 MeV, and high sensitivity will be achieved by means of a high intensity 100 μA beam on a 0.5 g/cm^2 Tungsten target resulting in very high luminosity. The experiment should be able to observe the A$'$ with a coupling constant $\alpha' \sim 1 \times 10^7$ times smaller than the electromagnetic coupling constant α. To deal safely with such enormous intensity and luminosity, a full radiation analysis must be used to help with the design of proper radiation shielding. The purpose of this talk is to present preliminary results obtained by simulating radiation background from the APEX experiment using the 3D Monte-Carlo transport code Geant4. Included in the simulation is a detailed Hall A setup: the hall, spectrometers and shield house, beam dump, beam line, septa magnet with its field, as well as the production target. The results were compared to the APEX test run data and used in development of the radiation shielding for sensitive electronics.

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