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The Scintillator-Layered Imaging Microscope for Environmental Research EMILY BUCHANAN, M. F. KIDD, Tennessee Tech University, S. R. ELLIOTT, K. RIELAGE, Los Alamos National Laboratory — In microbial ecosystems, a high-throughput analysis can match microorganisms with the compounds they metabolize. This is a vital process, but the current tools are limited in both time and resolution. A new tool, SLIMER (the Scintillator-Layered Imaging Microscope for Environmental Research), will incorporate a thin-film microcolumnar scintillator in a standard fluorescent microscope, to allow measurement of both fluorescence and radioactivity in a single step and to improve by a factor of 10 the resolution of current tools. In order to study the properties of SLIMER, a simulation to illustrate the topology of events was developed from the ground up with the GEANT4 toolkit. The simulation consists of CsI tubes, 1 μm in diameter, in a 1 cm by 1 cm array, with a C-14 source. The GEANT4 package for radioactive decay was used to model the decay of C-14, and the package for optical photon processes was used to realistically model the optics of scintillation. The HepRApp Visualization Browser was used to provide a visual model of the scintillator, source, and particle tracks. The developed simulation provides useful information about the capabilities and properties of SLIMER, which in turn will impact the way microbial ecosystems and their impact on the environment are studied.

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