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Extending EGS with SVG for Track Visualization

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The Electron Gamma Shower (EGS) Code System at SLAC is designed to simulate the flow of electrons, positrons and photons through matter at a wide range of energies. It has a large user base among the high-energy physics community and is often used as a teaching tool through a Web interface that allows program input and output. Our work aims to improve the user interaction and shower visualization model of the EGS Web interface. Currently, manipulation of the graphical output (a GIF file) is limited to simple operations like panning and zooming, and each such operation requires server-side calculations. We use SVG (Scalable Vector Graphics) to allow a much richer set of operations, letting users select a track and visualize it with the aid of 3-D rotations, adjustable particle display intensities, and interactive display of the interactions happening over time. A considerable advantage of our method is that once a track is selected for visualization, all further manipulations on that track can be done client-side without requiring server-side calculations. We hence combine the advantages of the SVG format (powerful interaction models over the Web) with those of conventional image formats (file size independent of scene complexity) to allow a composite set of operations for users, and enhance the value of EGS as a pedagogical tool.

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