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**Dynamics of ionization wave produced by relativistic electron beam inside a glass target** P. LEBLANC, Y. SENTOKU, V.V. IVANOV, K. YATES, P. WIEWIOR, J. KINDEL, University of Nevada, Reno, USA, G.S. SARKISOV, D. JOBE, R. SPIELMAN, Ktech Corporation, Albuquerque, NM, USA, V. YU. BYCHENKOV, Lebedev Physics Institute, Moscow, Russia — Recent laser-matter experiments have revealed interesting features of the motion of electrons at the front of an ionization wave propagating inside a solid density silica glass target. Using an ultra-intense ultra-short pulse laser, highly relativistic electrons were created in the interaction region at the interface of the glass and were subsequently accelerated longitudinally inside the target. Results showed the ionization bubble inside the target expanding anisotropically with a heavy bias towards the lateral direction after a few picoseconds. Furthermore, electrons at the front of the ionization wave appeared to curve back on themselves creating a "fountain effect." Using a 2D particle-in-cell code capable of resolving collisions and ionization of solid density materials, we simulated a scaled version of this experiment and show the anisotropic expansion bias as well as the electron fountain effect. Analysis of the results reveal a very strong buildup of the electrostatic field at the front of the ionization wave due to strong gradients in the longitudinal current. Fast free electrons respond to the field buildup by curving outwards and back upstream with respect to the path of the laser beam.

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