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Cavitation and hollow foam-like structure formation in the dense core of exploded wire[1] S.A. PIKUZ, T.A. SHELKOVENKO, P.F. KNAPP, C.L. HOYT, D.A. HAMMER, Cornell University, V.V. ZHAKHOVSKY, University of South Florida — Complex hollow foam-like structures in the exploded wire cores have been observed with the help of high resolution x-ray radiography and x-ray K-shell absorption spectroscopy with single and multi-wire loads in the load current range from 2 kA/wire to 250 kA/wire. The processes of hollow structures formation have been studied depending on wire material, load configuration and discharge parameters. Large-scale molecular-dynamics (MD) simulations of aluminum and nickel wires are being carried out to try to develop an understanding of the observed structures. Density profiles in the simulations show qualitative agreement with the experimental X-ray radiographs in both single wire explosions and the explosions of twisted wire pairs. The MD simulations predict that the exploding wire cores should experience cavitation and the formation of vapor bubbles within the liquid phase.

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