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Effect of metallic foil thickness distribution on energy deposition during its electrical exploding FAN LEI, QIUBO FU, None — Exploding Foil initiator (EFI) refers to the rapid heating, melting, vaporization and ionization processes of metallic foil driven by high pulsed current. It is widely used in accelerating plastic slappers for high pressure experiments or igniting energetic materials safely and efficiently. The thickness distribution of the metallic foil will strongly effect the energy deposition on the foil. In order to confirm this point, a series of EFI test are conducted by changing the Bridge (narrow part) and Ground (wide part) thickness of the foil. The experimental setup is revealed in figure 1.The electrical energy is firstly stored in a capacitance, and after the high-voltage switch is triggered the current of RLC circuit starts to grow. The maximum current reaches several kA causing the rapid heating of the foil. The current I(t) and voltage U(t) are record by a oscilloscope. By applying suitable time-varied inductance L(t), a 2-D simulation code is developed to simulate the current and voltage curves of the foil and gives the temperature and energy distribution on the foil during its rapid heating. The experimental and simulated result both indicate that the electrical energy more likely deposits in the thin or corner areas. This research provides a way to control the energy distribution and builds up a simulation code to help us understand the mechanism of the foil exploding.

Figure 1. the schematic diagram of the EFIs experimental system.

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