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# Investigation on discharge mechanism of a particle beam triggered gas switch

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A transient optical diagnostic system for studying the discharge characteristics of the particle beam triggered gas switch was built, the temporal and spatial evolution of particle beam was observed in real time, the velocity curves of particle beam under different gas pressures were obtained. And at the lowest working coefficient of 47.2%, the discharge processes of the two spark gaps were photoelectric diagnosed and analyzed respectively. The results showed that, particle beam moved forward in a bullet mode, and the speed of which increased with the decrease of pressure, and decreased with the increase of time. At the initial time, the speed was fastest. The positive and negative streamer was occurred in the trigger gap and jet gap respectively, and the delay time of the two gaps was 34.2ns and 42.1ns, which was basically same as optical diagnostic results. The particle beam triggering was a non-penetrating induced discharge method, the electric field of the head of discharge channel was enhanced through injecting electrons to the spark gap, and discharge process was accelerated from electron avalanche to streamer, and it was conducive to the rapid closure of the switch.

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