TECHNICAL FEASIBILITY OF PSEUDOSPARK CONFIGURATIONS AS PULSED ION SOURCES

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Many modern particle accelerators are designed for high currents of ions. These ions have to be grouped in matched bunches to be acceptable for the accelerators. If only a undamped current of ions is available, a non negligible part of the current has to be dumped. This leads to high energy losses and in consequence a bigger cooling system is required.

To prevent these losses we studied the capabilities of pseudospark configurations as pulsed ion sources. A pulsed ion source will reduce the need of dumping and the related energy losses. One big problem of pulsed ion sources is the energy uncertainty at the ignition of the internal plasma. Pseudospark switches had shown, that they reach their high current phase very fast. In this phase they can be used as a source of ions. The short rise time leads to a short time of not well defined energy allocation in the plasma. In the moment the ignition is completed and the high current phase is reached the energy uncertainty of the extracted ion beam will reach the minimum. So there is just a short time of μs at the beginning of the bunch of ions with increased energy uncertainty.

We concentrated our efforts on the internal plasma parameters of the pseudospark configuration and on reducing the rise time to the final conditions. The results for various setups und working gases will be presented.