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Laser induced plasma for HPM Compressor Switching

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A key parameter for the compressor operation is the switch performance, transferring from a storage (high Q) phase to release (low Q) phase. By initiation of plasma due to a gas discharge phenomenon it is possible to drastically change the boundary conditions and enable a fast phase transfer.

In this work, we investigate the use of a high peak power laser pulse to generate seed electrons and initiate discharge. This mechanism, which utilizes multi-photon ionization in a strong RF environment, enables one to prevent the self breakdown (working slightly below the threshold) and yet to have a sub-ns buildup of seed electrons density followed by volume avalanche growth. This results in improved switching performance and greatly reduced time jitter.

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