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Plasma channels for electron accelerators¹ NELSON LOPES, ROXANA ONOFREI, JOAO SAMPAIO, RITA MACEDO, GONCALO FIGUEIRA, JOAO DIAS, NUNO LEMOS, LUIS SILVA, GoLP - Centro de Fisica dos Plasmas, Instituto Superior Tecnico , Lisboa, Portugal — The pre-formation of full ionized plasma waveguides in low Z gases may increase the energy gain and improve the electron bunch properties of plasma accelerators by extending the length of the high intensity interaction. High-voltage capacitive discharges can be used to produce and heat a plasma line. The discharges can be made through a dielectric capillary tube in order produce a straight plasma waveguide. On the other hand, the initial plasma line produced by the discharge can be on an open geometry (free space between electrodes) if we use a fast rise-time high-voltage pulse and use a laser pulse with enough intensity to trigger the discharge by optical-field-ionization. In this work we present the first results of a new scheme to produce plasma wave-guides for electron accelerators. It uses high-voltage discharge through a sequence of thin plates allowing the radial expansion of the plasma. This scheme can be used in a broad range of pressures and introduces a reduced amount of gas in the laser focusing region.

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