Transport and hybrid acceleration of protons

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For any application the energy and number of protons in a laser accelerated beam are key factors, but the beam quality is equally important. Angle and energy selection are needed to select a usable beam. In the TNSA regime energies up to 50 MeV have been reached with short pulses and we show that 3D simulations results are compatible with experimental results if the presence of a low density layer such as a preplasma on the target is taken into account. Due to the exponential nature of the energy spectrum the number of protons in an energy slice close the E_{max} or below $E_{max}/2$ can vary by two orders of magnitude and post-acceleration may be required in order to reach the desired energy and intensity. We compare the transport efficiency obtained with a transport line based on a solenoid, on quadrupoles, on dipoles for a simulated beam with $E_{max} \sim 50$ MeV. The solenoid selection provides the beam with the highest charge suitable for injection in a high field linac and post-acceleration. Even though the hybrid scenario might be compatible with the minimal requirements for medical applications, the design of optimal transport lines for beam shaping, based on start to end simulations, remains the basic step.