

**Accelerators Schemes based on Lasers and Plasmas, P. MINE**, Ecole Polytechnique, Palaiseau - The three methods proposed to accelerate particles by laser beams focused into plasmas (beat wave, wakefield and self-modulated wakefield) are now well established by several experiments in the world. The measured electric fields are, as predicted, exceeding by several orders of magnitude those used in conventional accelerators. Two other methods using lasers (inverse Cerenkov effect and inverse free electron laser) have been also experimentally validated in recent years. We present a discussion and comparison of the performances and limitations of these actual "proof of principle" experimental results. Laser channeling by plasma, which has been theoretically and experimentally investigated, can increase significantly the interaction length. Future improvements should include not only high energy gain, but also good emittance and low dispersion in energy. Plans for a 1 GeV single accelerating stage prototype are now under active study for the next generation experiments.