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Proton Driven Plasma Wakefield Acceleration (AWAKE) Experiment

The construction of ever larger and costlier accelerator facilities will eventually require new technologies to push the energy frontier. Plasma Wakefield acceleration (PWA) is a rapidly developing field which appears to be a promising candidate technology for future high-energy accelerators. Proton Driven PWA has been proposed as an approach to accelerate an electron beam to the TeV energy regime in a single plasma structure. The advantage of proton- over laser- or electron-driven PWA is the high stored energy available in the driver; both for the bunch as a whole and for the individual drive particles. Existing proton bunches carry many kJ of stored energy while high power lasers are presently approaching the 1-5 J regime. Proton bunches are therefore promising drivers for high-energy lepton accelerators, with the potential of reducing drastically the number of required driver stages.

Author: GSCHWENDTNER, Edda (CERN)

Co-authors: PARDONS, Ans (CERN); Dr GODDARD, Brennan (CERN); Dr BRACCO, Chiara (CERN); Dr VINCKE, Helmut (CERN); MEDDAHI, Malika (CERN)