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**Simulation of positron acceleration in Plasma Wake Field Accelerator (PWFA)** WEIMING AN, University of California Los Angeles, WEI LU, CHENGGUN HUANG, WARREN MORI — The Plasma Wake Field Accelerator (PWFA) concept is very attractive because the accelerating gradient can be three orders of magnitude higher than that of a traditional RF accelerator. In this poster the acceleration of positron beams in PWFA is investigated both in the linear and weakly nonlinear regimes. The results show that a beam-loading efficiency around 50% can be achieved both in the linear and weakly nonlinear regime when the spot sizes of both the drive beam and trailing beam are  $k_p\sigma_r \sim 1$ . In the linear regime the total charge of the accelerated positron beam and the average accelerating gradient are both smaller than those in the weakly nonlinear regime. Issues related to energy spread are also discussed.

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