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Simulation Study of PWFA Experiments at FACET WEIMING AN, NAVID VAFAEI-NAJAFABADI, KEN MARSH, CHRIS CLAYTON, WARREN MORI, CHAN JOSHI, UCLA, ERIK ADLI, SEBASTIEN CORDE, MICHAEL LITOS, SELINA LI, SPENCER GESSNER, JOEL FREDERICO, JOEL ENGLAND, DIETER WALZ, MARK HOGAN, SLAC, PATRIC MUGGLI, MPI, JEAN P. DELAHAYE, CERN, WEI LU, Tsinghua University, UCLA — Recent PWFA experiments at FACET use Rb gas ionized by the beam as the plasma source. The Rb has a lower ionization threshold than the Li, which was used in earlier experiments, consequently a smaller peak current beam can still produce a field ionized plasma. But the Rb vapor is confined by Ar and as a result it is possible to ionize both the first electron of Ar (I.P. 14eV) as well as the second electron of Rb (I.P. 24 eV). This secondary ionization can lead to a source of dark current in a PWFA. In this work QuickPIC simulation results are presented for studying the influence by the “unwanted” ionization. In the simulation, both Ar and Rb vapor profiles are initialized as measured in the laboratory. We use different beam parameters (including different focal position) in the simulation. The ion density of the gas is a useful diagnostic showing the ionization level of the neutral gas in the simulation. Other simulation results related FACET experiments are also presented.

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