

Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Experimental Investigation of Plasma Density Gradient Effect on Self-Modulation of a Proton Bunch TATIANA NECHAEVA, Belarusian State University, Minsk, Belarus, PATRIC MUGGLI, Max Planck Institute for Physics, Munich, Germany, AWAKE COLLABORATION — We study experimentally the effect of a linear plasma density gradient on the self-modulation of a long proton bunch in a dense plasma. The density gradient modifies the phase velocity of the wakefields. It can thus modify the development of the self-modulation process through the time or distance along the plasma that protons spend in the focusing or defocusing phase of the wakefields. This could change the number and the charge of micro-bunches that result from the periodic action of the wakefields. This effect varies along the bunch and along the plasma and is observed after the saturation of the process. Plasma density changing along the proton bunch path can also change the modulation period of the bunch. Experimental results obtained in the AWAKE experiment¹ will be presented².

¹P. Muggli et al. (AWAKE Collaboration), Plasma Physics and Controlled Fusion, 60(1) 014046 (2017)

²F. Braunmueller, T. Nechaeva et al. (AWAKE Collaboration), to be submitted

Tatiana Nechaeva
Belarusian State University, Minsk, Belarus

Date submitted: 28 Jun 2020

Electronic form version 1.4