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## 2P02 - Modeling the wakefield excitation by a 28 GHz microwave pulse in a plasma filled waveguide

Tuesday 25 June 2019 13:00 (1h 30m)

A simple 1D model of the propagation of an ultra-short ( $\leq$  1ns), TM01 mode, 28 GHz, ~1 GW, microwave pulse produced by an SRBWO (Super Radiant Backward Wave Oscillator) in a ~10<sup>10</sup> cm<sup>-3</sup> density plasma shows that a wakefield develops as a result of the radial ponderomotive and the Lorentz force. This is a scaled-down equivalent of a laser wakefield experiment with more manageable parameters. The model shows that for best results the waveguide radius needs to be such that the Lorentz and ponderomotive forces balance in a particular way. We simulate the system by the 3D PIC LSP code and confirm this model. Moreover, we simulate the experimental waveguide which has a slotted wall. These slots are required to be wide enough so that the plasma produced at larger radii penetrates the waveguide filling it uniformly, large enough to allow diagnostics, and sufficiently small, so that the microwave radiation is contained.

**Authors:** CAO, Y. (Physics Department, Technion, Israel Institute of Technology); BLIOKH, Y. P. (Physics Department, Technion, Israel Institute of Technology); LEOPOLD, J.G. (Physics Department, Technion, Israel Institute of Technology); ROSTOV, V. (2 Institute of High Current Electronics, Russian Academy of Sciences, Tomsk, Russia); SLUTSKER, Ya. (Physics Department, Technion, Israel Institute of Technology); KRASIK, Ya.E. (1 Physics Department, Technion, Israel Institute of Technology)

Presenter: LEOPOLD, J.G. (Physics Department, Technion, Israel Institute of Technology)

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