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Project towards CO2-laser-driven wake-field accelerator with external injection

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The project will explore a large (e.g. psec or 0.5 mm) length of "bubble"in CO2-laser driven plasma wakefield accelerator. Injecting of an external high quality electron bunch with duration ~ 10 fsec synchronized with the "bubble"would allow us to accelerate high quality electron beams with energy stability and spread reaching towards 1E-4. We rely on CO2-laser power upgrades that are in progress at BNL. We present our considerations for visible diagnostics, plasma source with ramp-up and ramp-down density profiles and the electron bunch compressor to 10 fsec with emittance preservation. This project is supported by DoE HEP office grant #215125.

Primary author: Prof. LITVINENKO, Vladimir (Stony Brook University)

Co-authors: Prof. JOSHI, Chandrashekhar (UCLA); Dr POGORELSKY, Igor (BNL); Dr YICHAO, Jing (BNL); Prof. DOWNER, Michael (UT Austin); Dr ZGADZAJ, Rafal (UT Austin); Prof. MORI, Warren (UCLA); Dr HAO, Yue (BNL)

Presenter: Prof. LITVINENKO, Vladimir (Stony Brook University)

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