

Photonic Band Gap Accelerating Structures Progress Report

4Q FY18

In the fourth quarter of FY18 the wakefield experiments at Argonne Wakefield Accelerator (AWA) was finally executed. We conducted wakefield acceleration experiments with the multiple drive bunches to increase the accelerating gradient. We could pass as much as 40 nC of charge through the accelerating structure and observe significant change in energy of the witness bunch. The results of the acceleration experiment are shown in Figures 1 and 2. The maximum observed energy gain in the witness bunch was 2.5 MeV, which corresponded to the gradient of about 18 MV/m. The publication is being prepared for the Physical Review Special Topics – Accelerators and Beams.

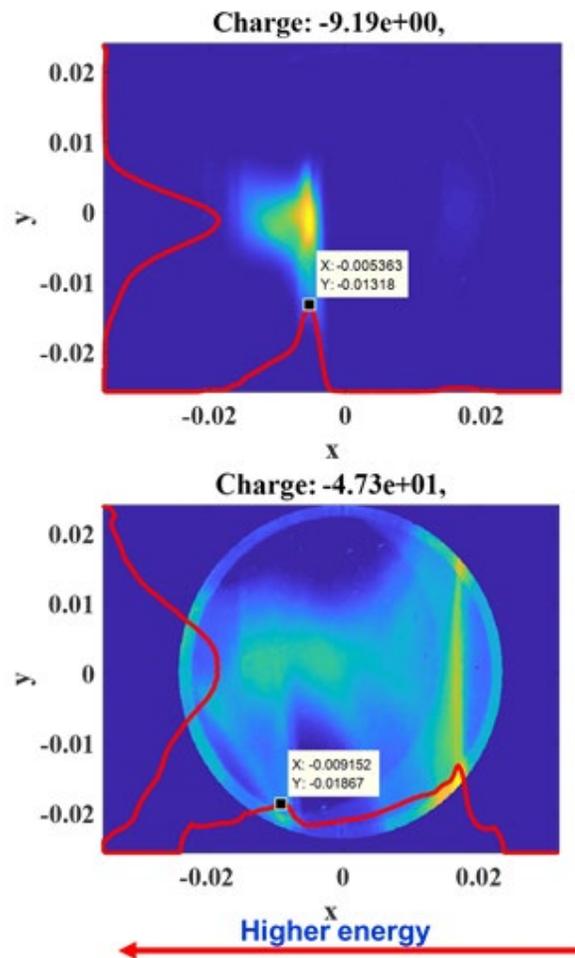


Figure 1: The spectrometer images of the witness beam after passing through the PBG structure in absence of the drive beam (top) and the witness beam and the drive beam after passing through the PBG structure (bottom). The energy of the witness beam increases when the drive beam is present.

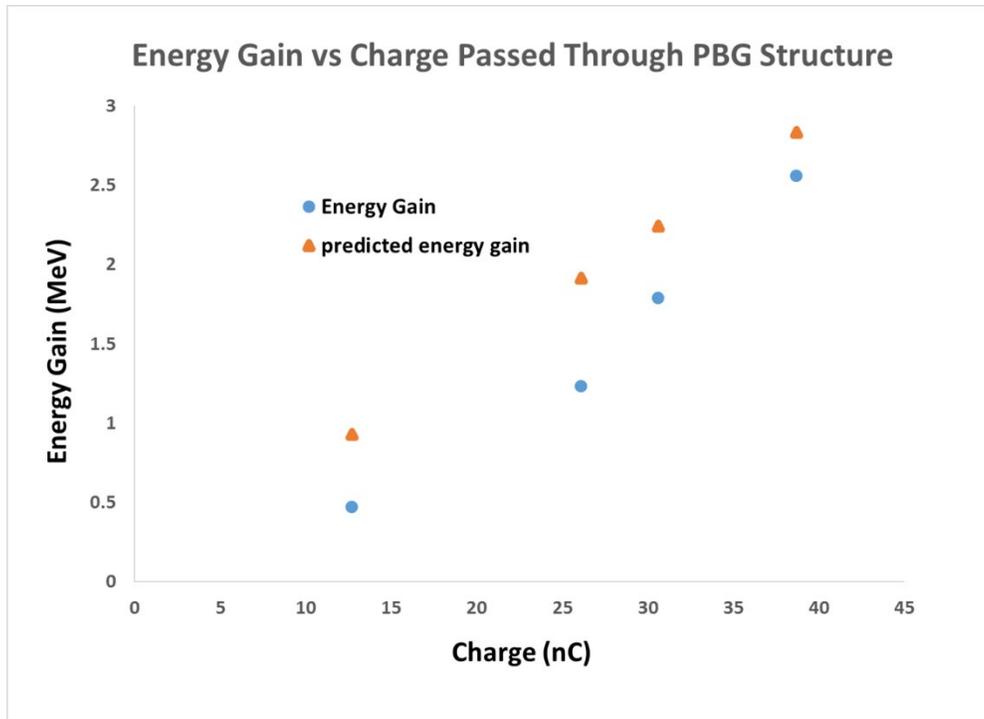


Figure 2: The energy gain of the witness beam as a function of the charge in the drive beam: simulations vs measurements.

In August, the LANL team has organized and ran the 18th Advanced Accelerator Workshop in Breckenridge, CO (Figure 3). The PI (Evgenya Simakov) was the co-chair of the workshop. The postdoc (Janardan Upadhyay) has presented two talks at the Working Group 4.



Figure 3: The logo of the 2018th Advanced Accelerator Concepts Workshop.

The structure for the high gradient testing at SLAC was successfully brazed and is awaiting the bead pull. The actual high gradient tests will follow next.

The postdoc has completed two years of training at Los Alamos National Laboratory and is currently transitioning to LANSCE operations on track to become an operational beam physicist. The PI is looking for a new postdoc.