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High transformer ratio in dielectric wakefield structures using longitudinal bunch shaping with an emittance exchange beam line.

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Two figures of merit of the collinear wakefield accelerator are the longitudinal electric field, E_z , and the transformer ratio, R , and both depend on the longitudinal bunch distribution. Precise control over the longitudinal distribution allows for optimization of the collinear wakefield accelerator for the application under consideration. A new program is under development at Argonne National Laboratory (ANL) to use an emittance exchange beamline to produce longitudinally shaped electron bunches in order to realize high transformer ratios. We present the status of the bunch shaping experiments as well as future plans for realizing high transformation ratios.

Primary author: Mr POWER, John (Argonne National Laboratory)

Presenter: Mr POWER, John (Argonne National Laboratory)

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