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Acceleration of a positron beam in a hollow channel plasma

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Hollow plasma channels have been proposed as a technique for generating accelerating fields without deleterious transverse forces. In this experiment, we generate meter-scale hollow plasma channels using high-order Bessel profile lasers to ionize a Lithium vapor source. The experiment took place at FACET at SLAC National Accelerator Laboratory. FACET was the only facility in the world capable of providing positron beams for PWFA experiments. Using a higher-charge positron beam to excite a wake in the hollow plasma channel, we are able to demonstrate the acceleration of a lower-charge trailing beam traveling in the hollow channel wake.

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