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## **Acceleration and Focusing of Positrons Using Elongated Bubbles in Warm Plasmas**

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Plasma wakefields produced by high-charge electron bunches are attractive for lepton colliders because they combine high-gradient acceleration and, in the regime of full electron blowout, emittance preserving linear focusing of the accelerated electrons by the remaining positively charged ions. Achieving the same for positrons is more challenging because it requires producing a uniform high-density filament of plasma electrons. I will discuss a novel approach to creating such filaments behind the driver-generated plasma “bubble” by adding a trailing escort bunch. Initial plasma temperature, as well as the electric charge and time delay of the escort bunch, determine the size of the filament region favorable to simultaneous focusing/acceleration of witness positrons. I will further discuss how efficient energy transfer from the driver to the positrons, combined with emittance preservation, can be achieved for such elongated bubbles in warm plasmas.

### **Acknowledgments**

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