

Abstract Submitted  
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**Progress Towards a Positronium Beam** KAY PELLETIER, JASON ENGBRECHT, St. Olaf College — To date, work with positronium (Ps) has required either indirect statistical measurements or analysis done with high ( $>10$  eV) kinetic energy beams. Here we propose a low energy Ps beam that will allow for investigation of fundamental questions concerning Ps, such as gas scattering cross-sections and condensed matter surface interactions. These results may also improve material science analysis techniques by providing a better theoretical basis for pore analysis of materials. Using a new nanotube material we predict that positrons incident on the tubes will form positronium and be emitted at thermal energies in a well-collimated beam. In order to produce this beam we require a low noise, time tagged, and focused positron beam. To achieve a low background rate we use a bent magnetic field to filter out fast unmoderated positrons from the beam. A bunching circuit provides a timing signal for incidence on the nanotubes. Due to parasitic capacitances, significant transformations to the input waveform were required to achieve the ideal bunching waveform. Finally a neodymium magnet was used to focus the positrons onto a small spot on the nanotubes.

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