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**Influence of magnetic non-adiabaticity on a solid-Ne-moderated positron beam energy distributions.**[1] S. GHOSH, J. R. DANIELSON, C. M. SURKO, University of California, San Diego — High quality, trap-based positron beams typically operate in the regime in which particle transport is adiabatic. In this regime, the quantity $(\frac{E_\perp}{B})$ is a so-called adiabatic invariant (AI), where $E_\perp$ is the energy in cyclotron motion in the direction perpendicular to magnetic field $(B)$. Adiabaticity requires the parameter $\gamma = \frac{2\pi}{\omega_c}\frac{v_{||}}{|B|}\frac{d[B|}{dz}$ to be $<< 1$, where $\omega_c$ is the cyclotron frequency and $v_{||}$ is the parallel positron velocity. For beam transport energies $\leq 30eV$, invariance holds quite well for our trap-based beam from the buffer gas trap (BGT) to the test-gas cell. However, for larger transport energies, breaking of AI is observed at both ends of the beam tube between solid-Ne moderator and BGT, due to low $B$ and strong field gradients. This influences the parallel $(E_{||})$ and perpendicular energy $(E_\perp)$ beam distributions, while keeping the total energy conserved. Experimental results for a fixed source magnetic field show increases in perpendicular energy $(E_\perp)$ with increased moderator bias in the range $50 - 80V$ (i.e., where $\gamma \gtrsim 1$). Implications of this observation for BGT-based beam systems will be discussed.

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Soumen Ghosh
University of California, San Diego

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