Abstract Submitted
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Improved Temperature Diagnostic for Non-Neutral Plasmas with Single-Electron Resolution[1] SABRINA SHANMAN, LENNY EVANS, JOEL FAJANS, ERIC HUNTER, CHEYENNE NELSON, CARLOS SIERRA, JONATHAN WURTELE, Univ of California - Berkeley — Plasma temperature diagnostics in a Penning-Malmberg trap are essential for reliably obtaining cold, non-neutral plasmas. We have developed a setup for detecting the initial electrons that escape from a trapped pure electron plasma as the confining electrode potential is slowly reduced. The setup minimizes external noise by using a silicon photomultiplier to capture light emitted from an MCP-amplified phosphor screen. To take advantage of this enhanced resolution, we have developed a new plasma temperature diagnostic analysis procedure which takes discrete electron arrival times as input. We have run extensive simulations comparing this new discrete algorithm to our existing exponential fitting algorithm. These simulations are used to explore the behavior of these two temperature diagnostic procedures at low N and at high electronic noise.

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