Title: Stripping of H- beams by residual gas in the linac at the Los Alamos Neutron Science Center (Poster)

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Abstract
The linear accelerator at the Los Alamos Neutron Science Center (LANSCE) accelerates both protons and H- ions using Cockcroft-Walton-type injectors, a drift-tube linac and a coupled-cavity linac. The vacuum is maintained in the range of 10^-6 to 10^-7 Torr; the residual gas in the vacuum system results in some stripping of the electrons from the H- ions resulting in beam spill and the potential for unwanted proton beams delivered to experiments. We have measured the amount of fully-stripped H- beam (protons) that end up at approximately 800MeV in the beam switchyard at LANSCE using image plates as very sensitive detectors. We present here the motivation for the measurement technique and results.

Where can stripping occur?
Bending magnets and longitudinal phase-space test where a proton can originate and still be a contaminant.

Image-Plate calibration
Send a known charge to the image-plate & observe signal

Possible mitigation schemes
This background from the stripped beam is too high for the experiment we want to conduct. How can we reduce it to a tolerable level?
- Don't use the linac macro pulses in which H- is accelerated
- Use a pulsed deflector to eliminate beam between desired pulses
- Need a fast, powerful pulsed kicker
- For protons at 800MeV, Bp < 4 B Tm

CCL-only contribution
Eliminate stripped beam originating in the LEBT and DTL

Conclusions
- The fraction of H- minus beam that is stripped and contaminates the proton beam is:
  - Total: 9 x 10^-6
  - The CCL-only fraction is 4 x 10^-7
- Improving the LEBT vacuum would reduce the total fraction but would leave the CCL-only portion.
- This is an issue only when protons and H- ions are accelerated on the same macro pulse.