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AGS Beam Blowup by Kr Gas (preliminary of E-778)

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AGS STUDIES REPORT

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Experimenters H.C. Hseuh and E. Gill

Reported by H.C. Hseuh

Subject AGS Beam Blowup by Kr Gas (Preliminary of E-778)

OBSERVATIONS AND CONCLUSION

Purpose

To study the effect of residual Kr gas on the AGS beam to determine the limit of the gas jet experiment (E-778).

Study

The test was carried out on January 13, 1983 during the FEB run. Kr gas was bled into the AGS at IPM and pumped away by two turbos at E7 and E17, and by nearby ion pumps. A localized Kr gas zone about 10-15 meters (FWHM) in length was created during the 40-minute study with peak pressure as high as 2×10^{-5} Torr at IPM. The pressure distribution and beam profile were recorded at five different Kr gas levels.

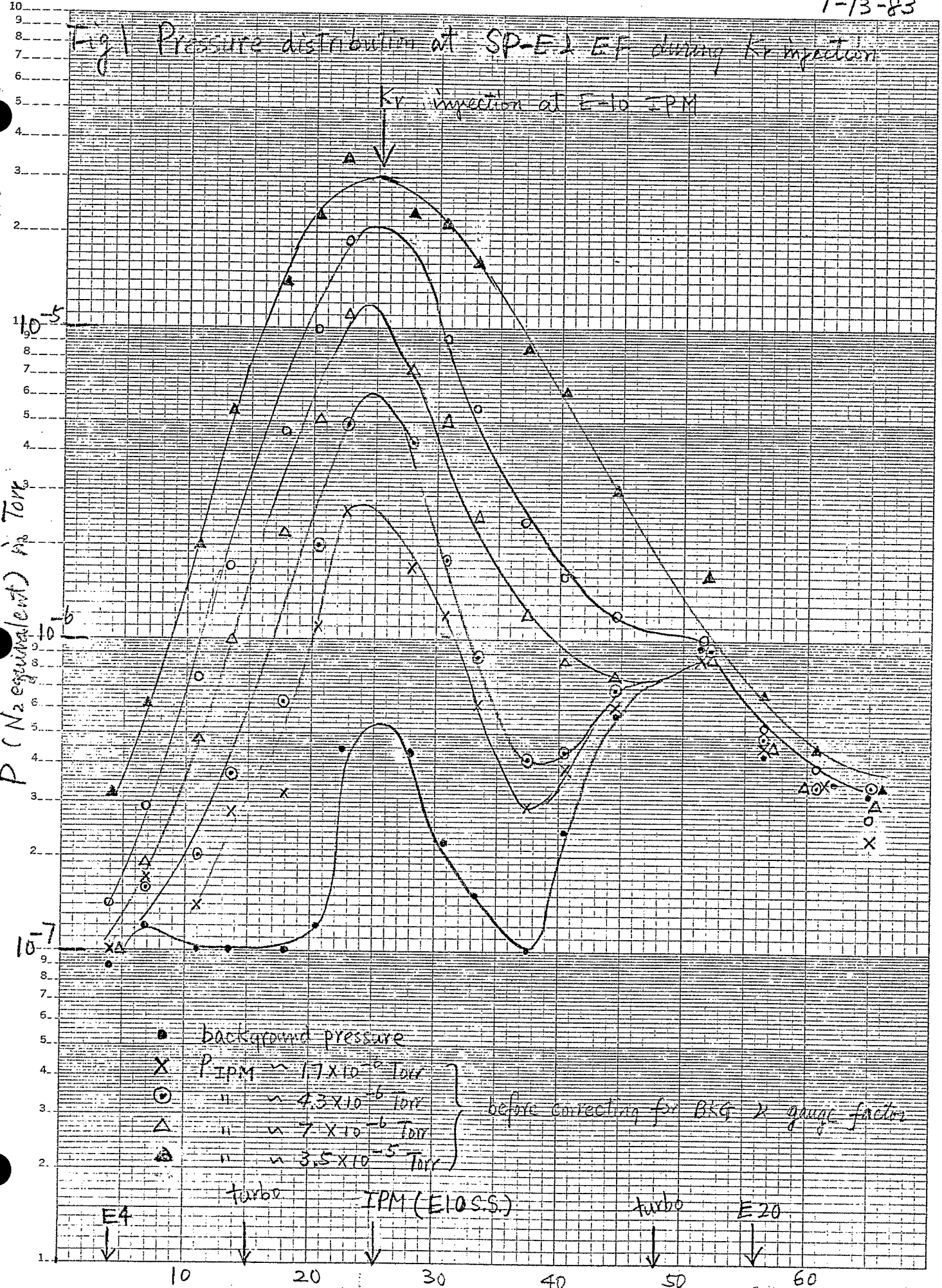
Result

The residual gas pressure distributions at superperiods E and EF are shown in Figure 1. The majority of bled-in Kr was removed by two turbomolecular pumps. The amount of Kr diffused into other superperiods was negligible. The integrals of the pressure distribution ($\int P \, d\ell$) are plotted versus the standard deviations σ of the bem profile in Figure 2. Up to ~27% increase in σ (both horizontally and vertically) and 10% decrease in beam intensity were observed at $P \times \ell \sim 3 \times 10^{-4}$ Torr m.

The proposed operation limit of E-778 with $\leq$ 10% Kr or Xe will have $P \times \ell < 1 \times 10^{-4}$ Torr·m, which will increase σ by < 10%.

1-13-83

Fig 1 Pressure distribution at SP-E2 EF during Kr injection



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