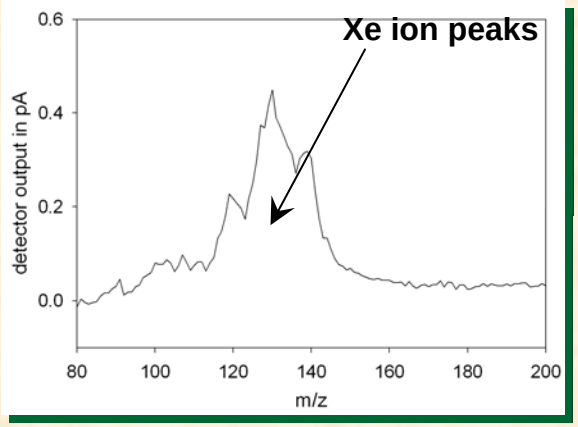
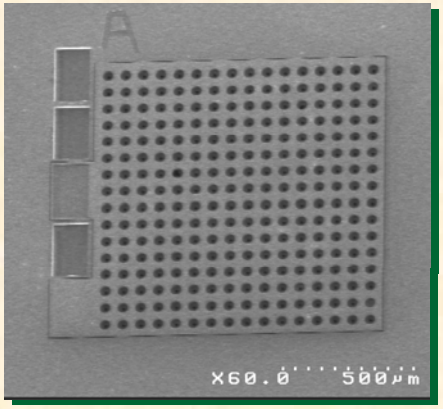
# Micro Ion Trap Mass Spectrometer

- **Goal:** Phase I, Develop a miniaturized mass spectrometer that operates at a pressure of 1 Torr.
- **Approach:** Mass spectrometry can be performed at higher pressures in an ion trap provided the mean free path is on the order of the dimension of the ion trap. Higher pressures require smaller traps. Sensitivity reduction due decreasing trap capacity with decreasing size can be offset by using arrays.
- **Accomplishments:** Mass spectra of xenon and DMMP have been obtained at ~1 Torr with a single 1-mm diameter ion trap. Ion trapping and ejection has been observed with 40-μm ion trap arrays.
- **Future work:** Phase II—Perform measurements at 76 Torr.
- **PIs:** W. B. Whitten and P. T. A. Reilly, ORNL,
  J. M. Ramsey, UNC, S. Pau, U. Ariz./Bell Labs.
- **Sponsor:** DARPA




**Ion signal (xenon) obtained with the array at left at low helium pressure ($10^{-4}$ Torr)**




**SEM image of low-capacitance array of 40-μm traps fabricated by Bell Labs**