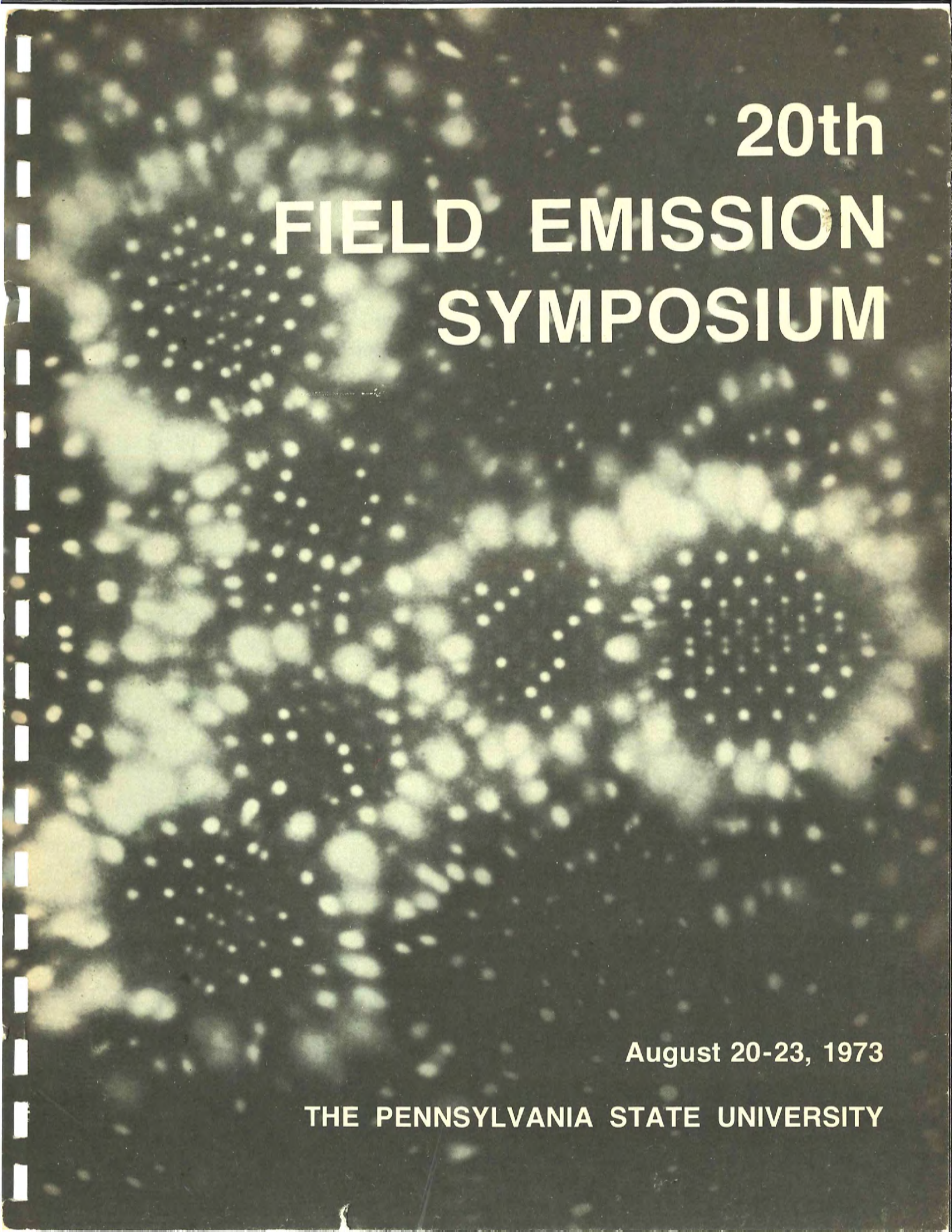

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Field Desorption Spectrometry*

by

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In this paper we describe an extension of the highly successful time-of-flight atom-probe technique developed by E. W. Müller and co-workers. By reducing the spectrometer drift distance to only 10-cm, the entire FIM image can be displayed on a curved chevron CEMA detector, and therefore, all ion species originating at the surface can be examined at one time. Single atom probing can be accomplished at one or several different crystallographic locations during a single evaporation event by positioning one or several external photomultipliers over areas of interest. Since the desorption image can be directly viewed and photographed the evaporation rate in vacuum can be precisely determined, and aiming problems are completely eliminated. The use of a triode lens similar to that of Brenner and McKinney results in an ion energy determined only by a stable dc supply, and therefore, severe evaporation pulse requirements can be relaxed. Finally, the small size of the device which does not need differential pumping, permits the use of inexpensive, bakeable high vacuum components, and permits rapid pumpdown to 10^{-10} Torr. Recent results obtained with the new instrument will be reviewed as well as a discussion of resolution which now approaches $\Delta^m/n = 0.8$ at $m/n = 63$. Several unique features of the instrument useful to conventional atom-probe spectroscopy will also be presented including a module which provides an oscilloscope sweep so that the detected species are displayed on a linear mass scale.

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