# Technique of Field Ion Microscopy

## EXAMINATION OF THE SURFACE STRUCTURE OF PLATINUM

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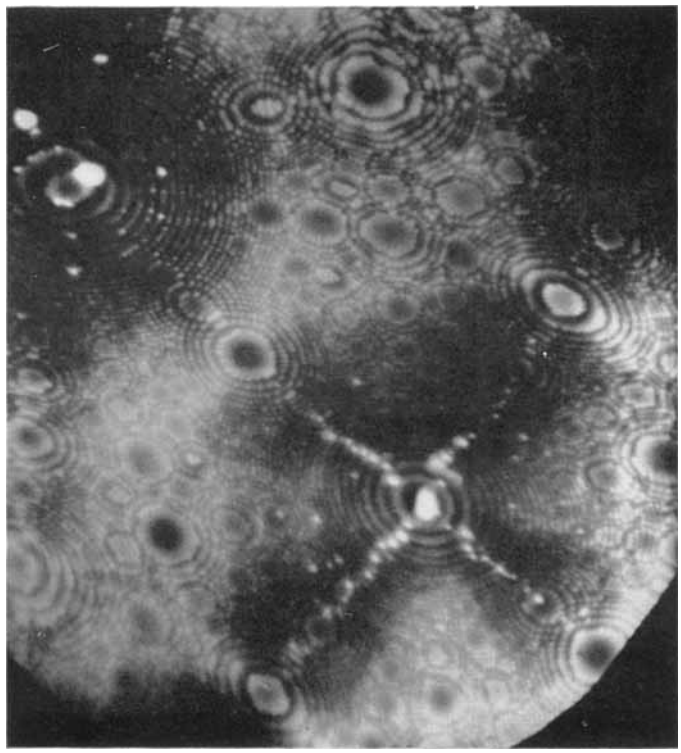
Field ion microscopy is a technique for observing individual atoms, and is capable of yielding pictures showing the surface structure of a metal in atomic detail.

In the field ion microscope the high electric field generated at a sharp point is used to overcome the potential barrier at the metal surface. Helium atoms in the neighbourhood of the surface lose electrons to the metal and are accelerated radially away from the point as helium ions. A "pinhole" image of the curved surface at the point is formed on a phosphor screen at a magnification of about one million times.

The resolution is sufficient to enable individual surface atoms to be imaged as bright spots on the screen.

The high electric fields needed to obtain an image produce large stresses which tend to disrupt the crystal lattice. These stresses may even result in "field" evaporation of the surface atoms and this effect limits the use of the field ion microscope to the study of refractory metals such as platinum, tungsten and molybdenum, which have high binding energies.

The field ion microscope, which has a resolution of 2 to 3 Å, was developed by Professor E. W. Müller in the United States, and is now being used for the direct observation of lattice defects introduced during irradiation and cold work. It is perhaps the most direct method of demonstrating the regularity of the crystalline lattice in metals.



*A field ion micrograph of a 500 Å radius platinum tip showing the regularity of the crystal lattice on an atomic scale*