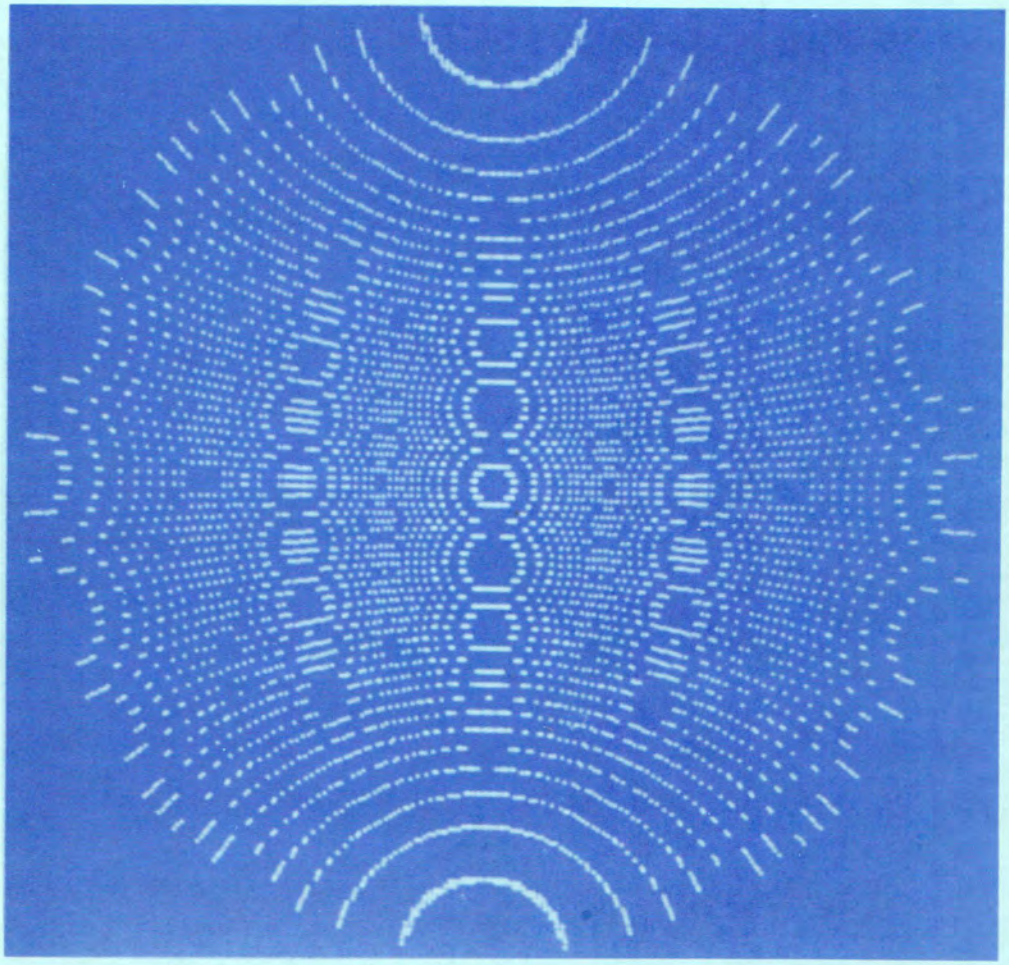
35th INTERNATIONAL FIELD EMISSION SYMPOSIUM

ABSTRACTS



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ELECTROHYDRODYNAMIC ION EMISSION FROM MOLTEN LITHIUM NITRATE*

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Positive ions have been generated at the surface of molten lithium nitrate by applying a high electrostatic field to a thin layer of this material on the apex of a field-emitter tip. The ion emission process is characteristic of electrohydrodynamic ion formation, usually observed when a high electric field is applied to the surface of a liquid metal or alloy. With molten lithium nitrate, a single emission site appears at threshold. The divergence of the ion beam is several degrees. At higher field strengths multiple emission sites are observed. An ion species at m/q = 76 amu dominates the mass spectrum at all field strengths. This species is identified as a cluster ion, $(LiNO_3)Li^+$. At low source temperatures $(LiNO_3)_2Li^+$ is also observed. Despite the low ionization potential of lithium (5.4 eV), Li^+ accounts for less than one percent of the total ion current generated by the source under all operating conditions. Multiply charged lithium is not detected in the mass spectra, suggesting the electric field at the Taylor cone apex is not sufficient to field-ionize singly charged species by a post-ionization process.

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