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Measurements of electron energy distributions in short DC discharges[1] J.M. WILLIAMSON, Innovative Scientific Solutions, Inc., Dayton, OH 45440, S.F. ADAMS, Air Force Research Laboratory, Wright-Patterson AFB, OH 45433, J. BLESSINGTON, V.I. DEMIDOV, West Virginia University, Morgantown, WV 26506 — The energetic portion of the electron energy distribution function (EEDF) in short DC discharge plasmas was investigated. For this experiment, a short DC discharge with a conducting radial wall and cold cathode was used. The conducting wall was electrically isolated and used as a large electric probe. The probe surface area was much larger than a typical cylindrical Langmuir probe. The application of the wall as an electric probe for plasma measurements was possible under the condition of nonlocality of the EEDF. Nonlocality is related to the dimension of the plasma volume and the gas pressure. Increasing the probe surface area results in an increase in probe sensitivity. Since the wall probe was nearly flat, the resulting contribution of the ion current to the measurements was also dramatically reduced. The measured EEDFs had clear signatures of the creation of energetic electrons in the plasma from atomic and molecular volume processes. Plasma particle densities were estimated from the probe measurement.

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