1056-65-1548 **Roland Griesmaier*** (griesmai@math.udel.edu), 501 Ewing Hall, University of Delaware, Newark, DE 19716-2553. *Reconstruction of thin tubular inclusions in three-dimensional domains using electrical impedance tomography.*

We consider the inverse problem of reconstructing thin tubular inclusions inside some three-dimensional body from measurements of electrostatic currents and potentials on its boundary. By inclusions we mean objects with an electrical conductivity differing from that of the background material of the body. Potential applications are, e.g., the detection of shrinkage defects in castings in non-destructive testing or the reconstruction of buried wires or tubes in subsurface imaging.

Applying an asymptotic expansion of the electrostatic potential on the boundary of the body as the thickness of the inclusions tends to zero we establish an asymptotic characterization of the inclusions in terms of the measurement data. This characterization is implemented in a non-iterative reconstruction method similar to the linear sampling method and the factorization method for crack detection problems in two-dimensional domains. We present numerical examples to illustrate our theoretical findings and to highlight the potentials and limitations of our method. (Received September 22, 2009)