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Fang Zeng* (fangzeng1985@gmail.com), Department of Mathematical Sciences, Delaware State University, Dover, DE 19901, **Jiguang Sun** (jsun@desu.edu), Department of Mathematical Sciences, Delaware State University, Dover, DE 19901, and **Fioralba Cakoni** (cakoni@math.udel.edu), Department of Mathematical Sciences, University of Delaware, Newark, DE 19716. *An inverse electromagnetic scattering problem for cavity.*

We consider the inverse electromagnetic scattering problem of determining the shape of a perfectly conducting cavity from measurement of scattered electric field due to electric dipole sources on a surface inside the cavity. We prove a reciprocity relation for the scattered electric field and a uniqueness theorem for the inverse problem. Then the near field linear sampling method is employed to reconstruct the shape of the cavity. Preliminary numerical examples are provided to show the viability of the method. (Received September 16, 2011)