

## LIGA fabricated X-ray Collimating Grids for Tiled Arrays

Dean V. Wiberg, Michael H. Hecht  
Center for Space Microelectronics Technology  
Jet Propulsion Laboratory  
California Institute of Technology  
Pasadena, California

Reid A. Brennen  
Hewlett Packard Research Lab  
Palo Alto, California

William Bonivert, Jill Hruby  
Sandia National Laboratory  
Livermore, California

Keith Jackson  
Lawrence Berkeley National Laboratory  
Berkeley, California

Fine pitch collimating grids have been under development for use in a High Energy Solar Spectroscopic Imager (HESSI) intended for orbital imaging of the sun. The imager consists of 12 pairs of collimating grids for individual imaging over 12 spectral regions from X-rays to Gamma rays. The finest grids have a 34 micron pitch with 14 micron wide gold absorbers which are approximately a factor of 2 smaller than any currently available. An approach has been taken using LIGA fabricated 1 cm by 3 cm tiles which allows a mosaic of tiles to be assembled to the area required using a variety of grid pitches and types to optimize the use of the detector imaging area. The LIGA grids are fabricated through the formation of free standing PMMA molds using the LIGA process. Gold is electroplated into the mold to a height approaching 1 mm while under mechanical constraint on a substrate of Copper or Beryllium. The tiles are then trimmed to final dimension using wire electrodischarge machining techniques. Using the fiducials that are lithographically defined on the tiles, they are precision positioned and bonded to an Invar frame to which other grids are attached forming a mosaic of tiles to the dimensions of the required imaging area.

keywords: collimating grids, LIGA, microelectroplating, MEMS, X-ray imaging