

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Ferrofluid Photonic Dipole Contours¹ MICHAEL SNYDER,
JONATHAN FREDERICK, Department of Engineering and Physics, Murray State
University, Murray, KY 42071 — Understanding magnetic fields is important to
facilitate magnetic applications in diverse fields in industry, commerce, and space
exploration to name a few. Large electromagnets can move heavy loads of metal.
Magnetic materials attached to credit cards allow for fast, accurate business trans-
actions. And the Earth's magnetic field gives us the colorful auroras observed near
the north and south poles. Magnetic fields are not visible, and therefore often
hard to understand or characterize. This investigation describes and demonstrates
a novel technique for the visualization of magnetic fields. Two ferrofluid Hele-Shaw
cells have been constructed to facilitate the imaging of magnetic field lines [1,2,3,4].
We deduce that magnetically induced photonic band gap arrays similar to electro-
static liquid crystal operation are responsible for the photographed images and seek
to mathematically prove the images are of exact dipole nature. We also note by
comparison that our photographs are very similar to solar magnetic Heliosphere
photographs.

¹Undergrad paper

Michael Snyder
Murray State University

Date submitted: 03 Dec 2007

Electronic form version 1.4