Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

**Development of a New High Strain Magnetostriction Material**[1]
AARON HAMANN[2], E DAN DAHLBERG[3], School of Physics and Astronomy —
A novel magnetostrictive (MS) material that produces reversible strains on the order of 5% will be described. The MS system we developed differs from conventional MS materials in that it is a composite of 0.025 cm diameter carbon steel wires cut to random lengths between 0.3 and 0.6 cm embedded in a soft polymer matrix. Eleven samples were investigated, each with different wire content. Magnetostrictive strains as large as 20% were observed in applied fields of 600 Oe, although these strains were not completely reversible; as stated earlier, the reversible magnetostrictive strains were at least 5%. The physical mechanism responsible for the large MS strains is the rotation of the wires to be parallel with an applied field, causing the polymer matrix to stretch in the direction of the field. This study was a proof of concept and efforts to maximize the strain were not taken.

[1]Work supported by the National Science Foundation under Grant No. DMR 1609782. One of the authors, AH, thanks the UROP Program of the University of Minnesota for support.
[2]University of Minnesota
[3]University of Minnesota

E Dan Dahlberg
School of Physics and Astronomy

Date submitted: 13 Nov 2016 Electronic form version 1.4