Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

Breakup of thin films of micro magnetic drops in perpendicular fields CHING-YAO CHEN, L.-W. LO, National Yunlin University of Science & Technology, Taiwan — New modes of striking drop breakup instabilities of a thin film of micro magnetic drops are experimentally observed under a constant perpendicular field. These modes are shown to depend strongly on the initial sizes of drops. Three modes of well-ordered breakup instability patterns are recorded for drop sizes ranging from diameter d=*400*μm to *1,400*μm. Mode I instability ($d \leqq$*400*μm) shows a fully evolved central droplet associated with numerous incompletely developed droplets in a formation of evenly distributed waves at a separated outer fluid annulus. These waves at the outer annulus are further destabilized and fully evolve into Mode II instability (*500*$\mu m \leqq d \leqq$*1,000*μm*)* which forms an additional outer circular array of droplets. A more vigorous Mode III instability with an additional array of droplets in the middle region and smaller secondary droplets in the outer array is observed for a even bigger initial drop size (*1,100*$\mu m \leqq d \leqq$*1,400*μm). For drop sizes $d \geq$*1,500*μm, a more complex Mode IV instability is recorded, which shows disorderly arrangements of numerous droplets in the middle region and derivative droplets at the outer array.

Ching Yao Chen
National Yunlin University of Science & Technology

Date submitted: 27 Jul 2005 Electronic form version 1.4