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 $d=400\mu m$ to $1,400\mu m$. Mode I instability ($d<400\mu m$) 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 ($500\mu m<d<1,000\mu m$) 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 ($1,100\mu m<d<1,400\mu m$). For drop sizes $d\geq1,500\mu m$, 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.