Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

Levitation, aggregation and separation of micro-sized particles in a Hydrodynamic Acoustic Sorter, HAS MAURICIO HOYOS, ANGELICA CASTRO, PMMH-CNRS-ESPCI, DESPINA BAZOU, Trinity College Dublin, SEPARATION COLLABORATION — Levitation, aggregation and separation of micron-sized particulate materials can be generated in a fluidic resonator by an ultrasonic standing wave field force. A piezoelectric transducer generates standing waves between the two walls of a parallel plate channel composing the resonator. The number of pressure nodes n is given by the relationship: $w = n\lambda/2$ with λ the wavelength. The primary radiation force generated by the standing wave generates levitation of micron-sized particles driving them toward the nodal planes. An equilibrium position is reached in the channel thickness where the acoustic force balances the gravity force. The equilibrium position is independent on particle size but it depends on the acoustic properties. Once particles reach the equilibrium position, transversal secondary forces generate aggregation. We shall present the levitation and aggregation process of latex particles and cancer cells in a 2MHz resonator. We demonstrate the possibility of separating particles under flow in a Hydrodynamic Acoustic Sorter HAS, in function of their acoustic impedance and in function of their size using a programming field force.

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Date submitted: 12 Aug 2011 Electronic form version 1.4