Institute Curie (IC)

Magnetic fluidized beads

Partner IC has recently developed an innovative approach to control the confinement and fluidization of functionalized magnetic fluidized beads for integrated on chip extraction and pre-concentration. This emerging technology combines self-assembled magnetic particles in a microfluidic device with fast diffusion, high loading capacity, high surface to volume ratio guaranteeing high capture efficiency for a broad type of samples, from molecules to cells. The system opens new regimes of operation combining a relatively high density of magnetic particles, for high capacity, an active hydrodynamic stirring, for increased kinetics, and a relatively high flow rate, allowing concentration of very dilute analytes from a rather large sample volume.
This miniaturized fluidized bed will be utilized to perform on-chip immuno-extraction of exosomes selectively from serum or plasma through their capture on specifically grafted magnetic beads. Early proof of concept has already been demonstrated with highly efficient protein capture, however with limited throughput (the flow rate being limited at 1µL/min).

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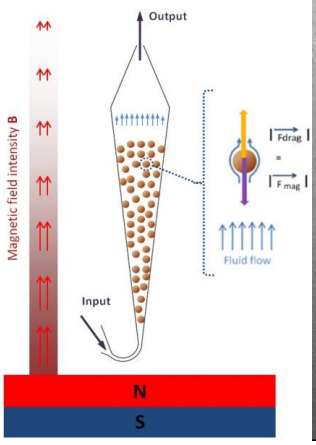
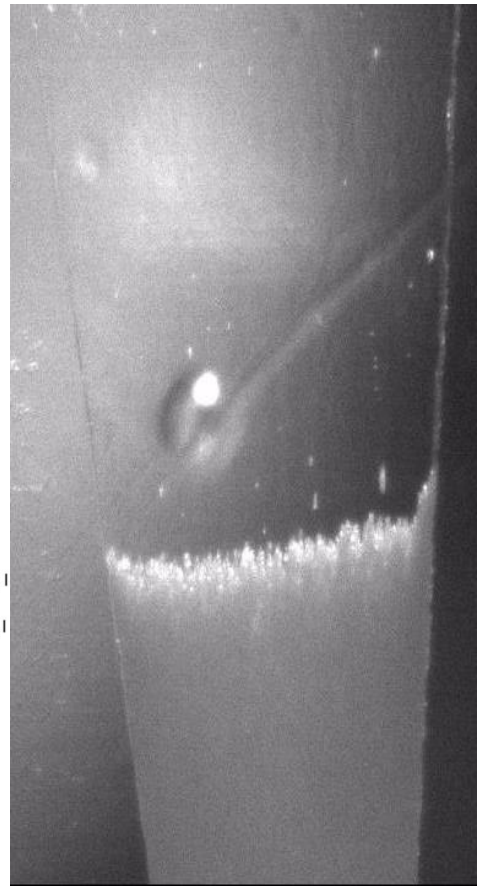
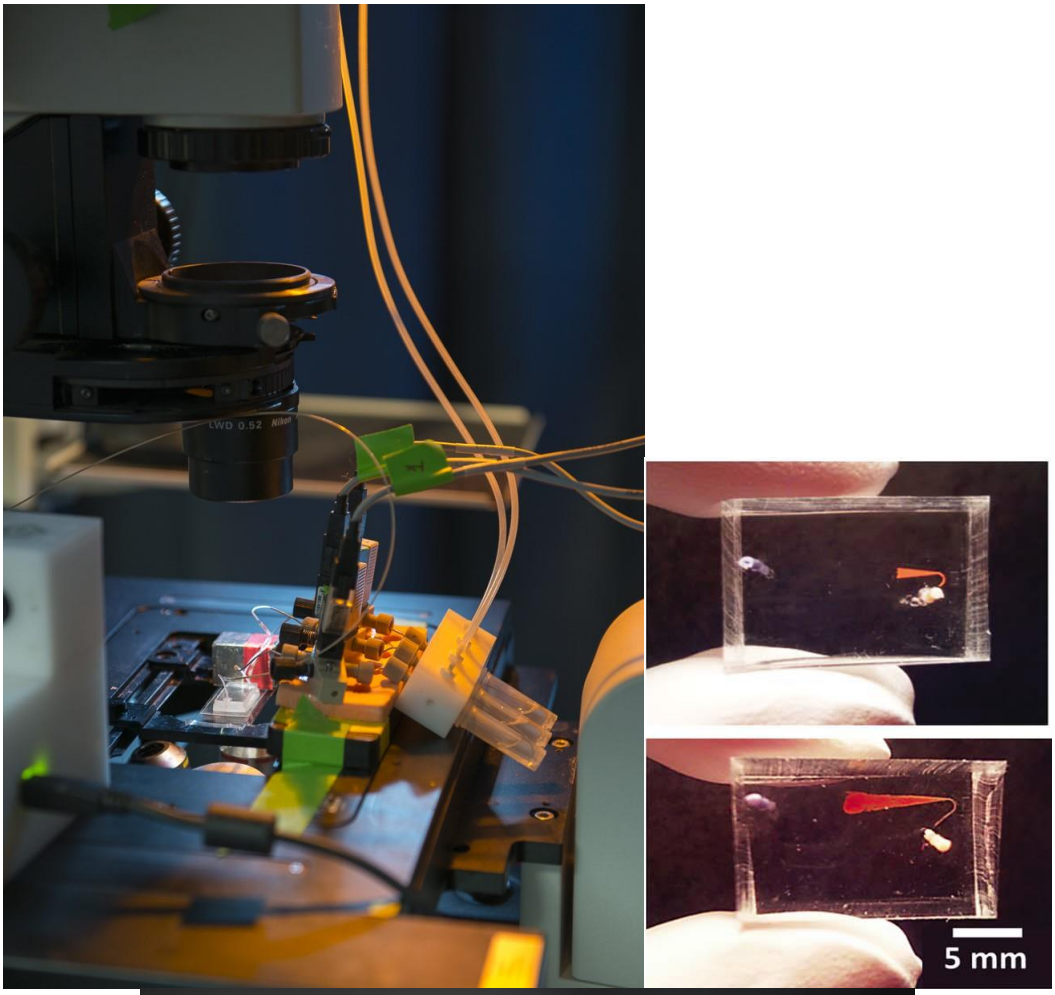




Schematic representation of a magnetic fluidized bed, optical images showing the plug of magnetic beads in a dynamic regime



Set up of the extraction system, chip containing the fluidized bed