

**G2Elab Staff:** 110 Researchers, Professors & ~100 PhD Students...

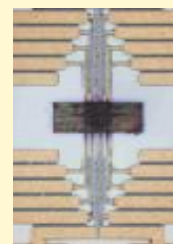
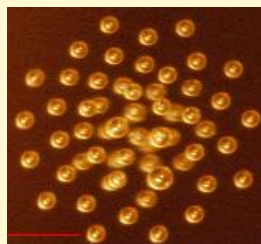
## Magnetic Microsystems Group: Mag-MEMS

5 Researchers, Professors & 6~8 PhD Students

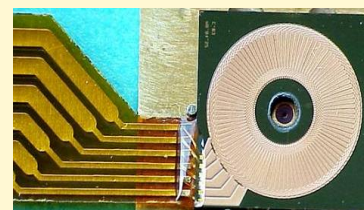
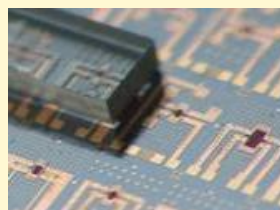
**Research fields:** Mag-MEMS, Power Mag-MEMS, Bio-Mag-MEMS, Diamagnetic Levitation and related technologies.

### Research topics in Micro and NanoSystems

- Diamagnetic Levitation for Digital  $\mu$ fluidics
- Diamagnetic confinement for Biology
- Bio-Mag-MEMS (attraction, arraying, sorting...)
- Mag-MEMS oriented Modelling Tools
- Integrated Smart materials (Magnetic & Hybrids)
- Power MEMS:  $\mu$ Motors -  $\mu$ Generators -  $\mu$ Sources
- $\mu$ Switches and actuators
- Integrated power supplies and D-RIE  $\mu$ coolers



*Diamagnetic Levitating 30 $\mu$ m droplets (left)  
Combined with dielectrophoresis for actuation (center) ( with LTM)  
Diamagnetically confined cells/ $\mu$ Beads on integrated  $\mu$ magnets (right)  
( with Inst. Neel, Biopuces, LETI & Ampere)*



*Out-of-Plane Magnetic 100 $\mu$ m switch  
&  $\mu$ motor/ $\mu$ generator (with LETI-CEA)*

### Technology Acces via MINATEC

Shared Clean Rooms of PTA & Cime Nanotech  
500 m2 Clean Rooms class 1000 & 100 ( 4" )

- Thick Sputtering of High quality Magnets (Inst. Neel)
- Most Classical  $\mu$ Electronic Equipment  
Sputtering, Evap, RIE, wet etching, Ovens, Implants...
- UV Double Side Litho & E-beam Masker
- + MEMS Technologies: Deep-RIE, CMP,  
Supercritical CO<sub>2</sub> Drying,  
Electrodeposition



### Design, simulation & characterization tools

- Analytical Simulation: CADES - MacMMEMS
- Numerical Simulation: FLUX, Comsol
- Masks: Cadence
- Characterisation Tools of Cime-Nanotech & FMNT  
(common Shared Multi-Labs Characterisation)