MICROSYSTEMS AND MECHANICS

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Microsystems (or Micro Electro Mechanical Systems, MEMS) are devices, like e.g. micro accelerometers, micro gyroscopes and micro pumps, whose dimensions are in the range of fractions of micrometers to millimetres with sensing and actuating functions. The great versatility and the reduced unit cost have been the basic ingredients for the large diffusion of microsystems in various fields like the consumer and automotive markets, structural monitoring and biomedical devices. The purpose of this talk is to describe some aspects of the microsystems complexity from a mechanical perspective. The focus will be on specific issues studied during the last nine years in strict collaboration with a major industrial partner. Starting from real cases, the presentation will deal in particular with the dynamics of resonant devices, the study of dissipative and multi physics phenomena, the study of key reliability issues such as fracture, fatigue and spontaneous adhesion (or stiction).

Keywords: Microsystems; MEMS; Multi-physics; Reliability; Damping;