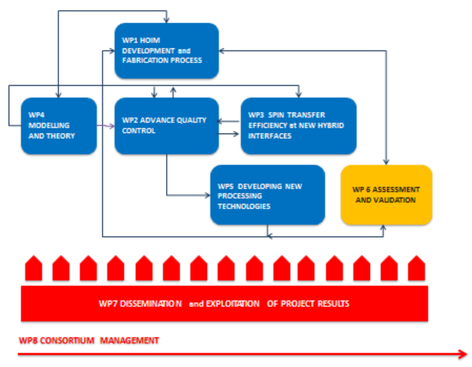
WP6: Assessment and validation

Wp leader: THALES



Topics investigated

The WP6 accommodates in a dedicated way the RTD effort aiming at a detailed analysis of the potential use of the developed in HINTS innovative HOI materials and acquired know-how for targeted ICT applications.

WP6 considers organically both the appeal and the potential strength of radically new properties achieved via HINTS advanced hybridization approaches (WP1-WP4) and the feasibility to transfer selected properties into commercial-scale oriented fabrication.

TECHNIQUE	SHORT DESCRIPTION	PLUS	MINUS	ACTION
Channel spark ablation CNR	Thermal ablation of the target using a concentrated electronic charge	Easy to deploy	Quite difficult to steer the charge, reproducibility quite low concerning composition and thickness	
Thermal evaporation CNR, all the partners	« Molecular beam epitaxy » using organics materials (room temperature substrate)	Quite good quality, easy to do	Quite long process (7 hour) and the efficacy of material utilization quite low (not low cost)	
E-beam evaporation CNR, MLU	Electronics current that locally heats a metallic wire and the evaporated material is deposited on an exposed surface at room temperature	Good quality	Concerns about irradiation? Integrity of the final material to deeply check	Action : to improve the material yield
Shadow-masking CNR, CNRS, MLU	Classical lithography	(lowest risk approach) low cost, easy to deploy	Not uniform precision (100µm) CNR MLU (100nm using another approach where geometry limited and not flexible)	Action : to improve the precision changing technology and to have a more flexible process
E beam lithography CNRS	Nanometer precision lithography	Very precise, very good resolution	Quite long and so costly	
Nano-identation CNRS	AFM probe to achieve junction	Very precise	Quite limited surface and so not scalable	
Laser scribing QMUL, MLU	Mask-less approach		Quite long approach and not very precise	
Spin-Coating deposition UVEG	Wet methods	Low –cost, easy to develoy	Not very precise to control the thickness	
Patterning of device by opt. lithography approach 1	Active area is defined by patterning of an insulating layer on top of bottom electrode	No critical processing after OSC deposition, easily transferable to electron beam lithography, shielding of devices during e-beam evaporation feasible		Scale down device area
Patterning of device by opt. lithography approach 2	Lithography done on capped OSC layer		Less reliable results, more technological effort needed compared to approach 1	Scale down device area
Shadow evaporation process for lateral devices	Fabrication of sub 100 nm channels in lateral devices by electron beam lithography, lift-off and shadow evaporation	In-situ preparation, channel length easily adjustable		Fabrication of lateral spin valve devices

Partners involved