

WP3

WP3 -MILESTONES		Year1				Year2				Year3			
activity	Topic	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
WP3-a	CAD & Simulations		setting CAD model and TFD ans TS symulation framework		Microfluidic simulation of single unit module: CFRP & DRIE		Simulation of "stave" assembly: CFRP & DRIE				Performace study (X <sub>0</sub> , T) one module unit assembly		
WP3-b	Micro-channel design	Micro-channel coolig: HL-LHC Layout Specification study: CFRP & DRIE	Technology constraints for DRIE on chip design. Cross process coordination with WP 1.	Micro channel single tube prototypes for Dp study: CFRP & BoroSilicate	Design od Optimized Micro channel single tube: CFRP	DRIE micro channel technique: design of prototypes.	DRIE micro channel technique:productio n of prototypes.	Test of DRIE prototypes	Selection among CFRP and DRIE micro-channel cooling	Design on "carrier wafer" of one module unit micro-channels		Validation of final micro- channel design	
WP3-c	Demonstrator with CO <sub>2</sub>		production of a "bottle" CO <sub>2</sub> refrigerator system				Set-up of Recycling CO2 refrigerator system (TRACI)			Set-up of optimized CO2 refrigerator system			
WP3-d	System integration	Set-up of TFD laboratory		Specificationand design of fluidic connectors	assembly of micro-channel system: CFRP	Connectors reliability demonstration for key components for single unit module			Optimization of manifold for "a stave", production of Interconnections parts for manifold.		Real assembly of parts: sensors + cooling unit; one unit module size		review of the best technology for experiment and validation of micro-channel cooling system

WP3 -DELIVERABLES		Year1				Year2				Year3			
activity	Topic	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
WP3-a	CAD & Simulations					Report: Full characterization of large area detector cooling							
WP3-b	Micro-channel design		Report: match of CFRP & DRIE Technologies to specification.		Micro channel single tube pultruded prototypes production		DRIE micro channel technique:productio n of prototypes.		Report: Selection among Pultruded and DRIE micro-channel cooling	Design of large area micro-channels		Report: Validation of final micro- channel design	
WP3-c	Demonstrator with CO <sub>2</sub>		production of a "bottle" CO <sub>2</sub> refrigerator system				Set-up of Recycling CO2 refrigerator system			Set-up of optimized CO2 refrigerator system			
WP3-d	System integration				Production of Prototypes: assembly of pultruded tubes.				Production of optimized connectors and key components		Production of fully assembled prototypes		Report: review of the best technology for experiment

WP3 -COSTS		Year1				Year2				Year3			
activity	Topic	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
WP3-a	CAD & Simulations												
WP3-b	Micro-channel design				10		20						
WP3-c	Demonstrator with CO <sub>2</sub>		43				40			20			
WP3-d	System integration	11							10		30		
	cost/year/Q	11	43	0	10	0	60	0	10	20	30	0	0
				TOT 2014 (Keuro)	64			TOT 2015 (Keuro)	70			TOT 2016 (Keuro)	50