FKPPL Project application (2012)

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ID: Title	A_RD_ATF2: Collaboration between KNU and LAL on the ATF2 project at KEK

Members	**French Group**			**Korean Group**		
	Name	**Title**	**Affiliation**	**Name**	**Title**	**Affiliation**
	Leader: Philip Bambade	DR2	LAL	Leader: Eun-San Kim	Prof.	KNU(KyoungPook National Univ.)
	Oscar Blanco (from March 2012)	PhD	LAL	Ayoung Her	PhD	KNU
	Sandry Wallon	IR2	LAL	Hye-Jin Kim	Master	KNU
	Frédéric Bogard	IE2	LAL	Si-Won Jang	PhD	KNU

Requested LIA specific funding from France				
Description	**Euro/unit**	**Nb of units**	**Total (euros)**	**Requested to: ***
Cost of attending FKPPL workshop in Clermont-Ferrand, May 2012	500	1	500	IN2P3
Visiting KNU and attending KILC in April 2012 (both in Daegu)	150 euro/day	2 x 5	1500	IN2P3
Travel to Daegu	1000	2	2000	IN2P3
Shipment of LAL produced external vacuum chamber with pre-installed KNU IP-BPMs from LAL to KEK	2500	1	2500	IN2P3
Total			6500	IN2P3

Requested funding from Korea				
Description	**Won/Unit**	**Nb of units**	**Total (Won)**	**Requested to: ****
Student internship on ATF2	1,000,000/month	1 months	1,000,000	KOSEF
Visit to LAL	200,000/day	30 days	6,000,000	KOSEF
Travel to LAL	2.000,000	2	4,000,000	KOSEF
Total			11,000,000	KOSEF

Additional funding	**Additional funding from France**			**Additional funding from Korea**		
	Provided by or requested to * **	**Type**	**Euro**	**Provided by or requested to**	**Type**	**Won**
	FJPPL & IN2P3	Travel to KEK		KOSEF	Travel to KEK	
	IN2P3	50% PhD funding, 2 LAL engineers		KOSEF	Student	
	ANR	Personnel, travel, some equipment (ends 04-11-2012)				

* For example: IN2P3, CEA. ** Korean University or Institute. *** French Embassy, CNRS Egide,……

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Summary of Project	Introduction: ATF-2 is an international project based at KEK (Japan) to build and operate a scaled-down prototype of the final focus beam line studied for the International Linear Collider (ILC) and Compact LInear Collider (CLIC) projects. The primary aims of the project are to establish the instrumentation and control techniques needed to maintain a beam focused down to less than 40 nanometer (Goal 1), stable at the nanometer level over long periods of time (Goal 2). Teams at KNU and LAL, led by Prof. Eun-San Kim and Dr. Philip Bambade, respectively, participate in the research at ATF2 since several years, on several aspects. Joint KNU-LAL R&D: Direct collaboration between KNU and LAL started in 2011 in the context of the IP-BPM project, a joint venture of KEK, KNU, LAL and Oxford ATF2 teams aimed at Goal 2 and involving measurements of the beam position at the virtual focal point of ATF2 (refered to as IP) with ~1 nanometer single bunch accuracy, as input to a bunch to bunch feedback system operating on the 300 nanosecond time-scale relevant to the time structure of the ILC bunch trains : 1) KNU, in collaboration with KEK, is developing the three low-Q RF beam position monitors with associated electronics, capable of achieving a nanometer level position resolution. 2) LAL is providing a new vacuum chamber to house and support the three IP-BPMs, with accurate internal / external pre-alignment and 3D remote micron-level internal adjustments needed for beam-based alignment and calibration procedures within the tightly defined dynamic range, as well as taking into account requirements from the « Shintake » beam size monitor lasers, which are brought to the IP with 2-8, 30 and 174° crossing-angles. 3) Oxford is providing a fast air-core kicker and FPGA-based feedback algorithm with latency small compared to 300 nanoseconds. 4) KEK is providing specific expertise and general support for integration on the beam line. Plans for 2012: 1) LAL will fabricate the external vacuum chamber and perform 3D measurements and vacuum tests with the three KNU IP-BPM blocks installed before shipment to KEK for pre-installation and beam testing. 2) KNU will perform beam tests in the ATF2 diagnostic area of the three low-Q RF beam position monitors and associated electronics that can provide a nanometer level position resolution. LAL will participate and help commission / operate the remote internal mechanical adjustment function for the 3rd BPM in the new external vacuum chamber. 3) KNU and LAL will install the 3 BPMs and electronics in IP region in ATF2 and measure the position resolution. 4) Beam signals from the IP-BPMs will be provided to Oxford FONT group that will be used for the beam feedback system. 5) In addition, LAL plans to develop a beam-based method for IP-BPM inter-calibration, which may be important to reach the final goal.