HFT - SOFTWARE

Resources
Institutional Responsibilities
Milestones

PRELIMINARY
DRAFT

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1. Institutional Contributions to Software effort

The tables list the responsibilities and the manpower available for the software tasks connected with the construction and operation of the HFT. We start with an overview detailing the responsibilities of all institutes and than list the responsibilities and tasks of the individual institutions by year and task. The manpower listed is sufficient to perform all the tasks listed in the task list. In addition to this manpower, the STAR collaboration as a whole will be involved in the physics analysis of data derived from the HFT detector as indicated by the "statement form the STAR spokesperson".

BNL	Simulations
IPHC	Simulations Analysis software
KSU	Software Coordination Simulations Tracking, calibration and alignment SSD Software
LBNL	Simulations Pixel calibration and alignment Test data analysis SSD commissioning
MIT	Simulations IST calibration and alignment IST Test data analysis
Prague	Simulations Cosmic ray tests
Purdue	Simulations Tracking development Calibration and alignment Analyze test data Cosmic ray tests
UCLA	Simulations Tracking software
USTC	Simulations Analysis software Calibrations

Software task		BNL	IPHC	UCLA	KSU	NPI	MIT	LBL	Purdue	USTC
Offline										
Hit Reconst.	IST						X			
	Pixel							X	X	
Tracking		X	X							
Event Vertex		X	X		X	X				
Decay Vertex		X	X		X	X				X
Calibration Db	SSD	X			X			X		
	IST	X					X			
	PXL	X						X	X	
Alignment	SSD	X			X			X		
	IST	X			X		X			
	PXL	X			X			X	X	
Simulation										X
Geometry	SSD	X			X			X		
	IST	X					X			
	PXL	X						X		
Fast/Slow Sim.	SSD				X			X		
	IST				X		X			
	PXL		X					X	X	
Embed./Pileup	IST				X		X	X	X	X
Assoc/Analysis		X			X	X				

Detailed Institutional Responsibilities

BNL

Year	FTE	Need	Name	Task
2012	0.4		JH.Lee	Simulations
2013	0.5		JH.Lee	Simulations
	0.5		Student	Analysis software
2014	0.5		Postdoc	Analysis software
	0.5		Student	Analysis software

IPHC Strasbourg

Year	FTE	Need	Name	Task
2012	0.5		Postdoc	Analysis software
	0.5		Student	Simulations
2013	0.5		Postdoc	Analysis software
	0.5		Student	Analysis software
2014	0.5		Postdoc	Analysis software
	0.5		Student	Analysis software

IPHC will concentrate on B meson physics.

Kent State University

Year	FTE	Need	Name	Task
2011	0.25		S. Margetis	Simulations/Alignment/Analysis
	0.5		Postdoc	Simulations – Analysis – SSD software
	0.4		Students	Calibration - Tracking - Analysis
2012	0.45		S. Margetis	Simulations/Alignment/Analysis
	1.0		Postdoc	Simulations – Analysis – SSD software
	1.2		Students	Calibration - Tracking - Analysis
2013	0.5		S. Margetis	Simulations/Alignment/Analysis
	1.0		Postdoc	Simulations – Analysis – SSD software
	2.0		Students	Calibration - Tracking - Analysis
2014	0.5		S. Margetis	Simulations/Alignment/Analysis
	1.0		Postdoc	Simulations – SSD software
	2.0		Students	Calibration - Tracking

KSU is responsible for the overall software design. KSU's physics analysis will concentrate on the analysis of R_{CP} initially.

LBNL

Year	FTE	Need	Name	Task
2011	0.5		Postdoc	Prepare analysis code
	0.5		Postdoc	Pixel Calibration
	0.5		Student	Pixel Calibration
	0.2		E. Sichtermann	Work with Postdoc and Student on simulations and analysis code
2012	0.5		Postdoc	Prepare analysis code
	0.5		Student	Prepare analysis code
	0.5		Postdoc	Pixel Calibration
	0.5		Student	Pixel Calibration
	0.2		E. Sichtermann	Work with Postdoc and Student on simulations and analysis code
2013	0.5		H. Wieman	Detector Operator (Pixel)
	0.3		E. Sichtermann	Work with Postdoc and Student on simulations and analysis code
	0.5		H. Matis	Detector Operator (SSD)
	0.5		H.G. Ritter	Work with Postdocs and Students
	0.5		N. Xu	Work with Postdocs and Students
	1		Postdoc	Calibration
	1		Postdoc	Calibration
	0.5		Student	Calibration
	0.5		Student	Calibration
2014	0.5		H. Wieman	Detector Operator (Pixel)
	0.5		E. Sichtermann	Work with Postdoc and Student on physics analysis
	0.5		H. Matis	Detector Operator (SSD)
	0.5		H.G. Ritter	Work with Postdoc and Student
	0.5		N. Xu	Physics Analysis
	1		Postdoc	Calibration
	0.5		Student	Calibration

LBNL is responsible for the calibration software of the Pixel detector and for analysis software. LBN also is participating in the SSD upgrade. LBL also will be responsible for the operation of the Pixel and the SSD detector. Initially, LBNL will concentrate on the D^0 analysis and extracting v_2 for D mesons.

MIT

Year	FTE	Need	Name	Task
2011	0.3		G.J van Nieuwenhuizen	IST calibration and alignment
	0.5		Postdoc	Prepare IST calibration, software
	0.5		Student	Prepare IST calibration, software
2012	0.3		G.J van Nieuwenhuizen	IST calibration, alignment, analysis
	0.5		Postdoc	Analyze cosmic ray tests
	0.5		Postdoc	Prepare physics analysis code
	0.5		Student	Slow Controls
	0.5		Student	Alignment
2013	0.3		B. Surrow	Work with Students
	0.6		G.J van Nieuwenhuizen	IST Detector operation, calibration, analysis
	0.5		Postdoc	Physics Analysis
	0.5		Postdoc	Detector operation
2014	0.3		B. Surrow	Work with Students
	0.6		G.J van Nieuwenhuizen	IST Detector operation, calibration, analysis

The MIT group will deliver and maintain the IST detector software, including slow controls, calibration software and detector specific software. This will be achieved by a phased approach with the software development closely following the detector development. The MIT physics program focuses on the study of heavy quarks in proton-proton collisions at a center-of-mass energy of 200GeV and 500GeV. Here, the main objective is the cross-section measurement of heavy quark production. In addition, the MIT group is planning to use the IST and SSD to aid the charge sign discrimination for mid-rapidity W production in the electron/positron decay mode at a center-of-mass energy of 500GeV in proton-proton collisions.

NPI ASCR/CTU Prague

Year	FTE	Need	Name	Task
2011	0.5		Student	Prepare analysis code
	0.5		Student	Cosmic ray tests
	0.3		J. Bielcik	Cosmic ray tests
2012	0.5		V. Kouchpil	
	0.5		Student	
2013	0.5		V. Kouchpil	
	0.5		Student	
	0.3		M. Sumbera	Work with students and post-doc
2014	0.5		V. Kouchpil	
	0.5		Student	
	0.3		M. Sumbera	Work with students and post-doc

The Prague group will initially concentrate on developing the analysis tools and analyzing the Λ_C.

Purdue University

Year	FTE	Need	Name	Task
2011	0.5		W. Xie	Work with Student and Postdoc on HFT calibration and data analysis.
	1.0		Postdoc	HFT Calibration software development Tracker/Vertex finders development
	0.5		Student	Tracker/Vertex finders development
	0.5		Student	Tracker/Vertex finders development
2012	0.5		W. Xie	Work with Students and Postdoc on data analysis and reconstruction software development
	0.15		Fuqiang Wang	Work with Students and Postdoc
	1.0		Postdoc	Development of reconstruction software for physics
	0.5		Student	Tracker/Vertex finders development, analysis code development

	0.5		Student	Develop data analysis codes
2013	0.5		W. Xie	Work with Student and Postdoc analysis software development
	0.25		Fuqiang Wang	Work with Student and Postdoc
	0.10		Andy Hirsh	Work with Student and Postdoc
	1.0		Postdoc	Analyzing cosmic ray test of fully integrated HFT system Analyze data from Pixel detector Analysis software development
	0.5		Student	Analysis software development Analyzing cosmic ray test of fully integrated HFT system
	0.5		Student	Analysis software development Analyzing cosmic ray test of fully integrated HFT system
	0.5		Student	Analysis software development
2014	0.5		W. Xie	Work with Student and Postdoc and analysis software development
	0.25		Fuqiang Wang	Work with Student and Postdoc
	0.10		Andy Hirsh	Work with Student and Postdoc
	1.0		Postdoc	Detector Operator (Pixel) Analysis software development
	0.5		Student	Analysis software development
	0.5		Student	Analysis software development
	0.5		Student	Analysis software development

Purdue University will focus on simulations and software development, e.g. the slow simulator. We will also participate in the calibration effort. For the data analysis we will develop the tools for charm and bottom separation and concentrate on this analysis.

UCLA

Year	FTE	Need	Name	Task
2011	0.1		H Huang	HFT Physics
	0.3		G Wang	Physics Simulation/Analysis code development
	0.5		Student	Physics Simulation/Analysis code development
2012	0.2		H Huang	
	0.4		G Wang	Tracking Software
	0.5		Student	Tracking Software
	0.5		Student	Tracking Software
2013	0.2		H Huang	
	0.5		G Wang	
	0.5		Student	
	0.5		Student	
2014	0.2		H Huang	
	0.5		Post-doc	
	0.5		Student	
	0.5		Student	

The heavy quark physics in nucleus-nucleus collisions is one of the research topics that the UCLA group will focus on in the coming years. Our involvement in the HFT project will begin with physics simulations related to the detector performance, in particular about the measurement of B and D decay contributions to non-photonic electrons at high transverse momentum. We will also devote graduate Student to analyze open charm production from hadronic decays. Our post-doc and graduate Students will work on analysis software and evaluation of tracking using HFT in the coming years.

USTC Hefei

Year	FTE	Need	Name	Task
2011	0.5		Student	Simulations, analysis software
2012	0.5		Postdoc	Analysis software
	0.5		Student	Simulations, Analysis software
2013	0.5		Postdoc	Analysis software
	0.5		Student	Analysis software
	0.5		Sun Yongjie	Work with Postdocs and Students on preparation of physics analysis
2014	0.5		Postdoc	Analysis software
	0.5		Student	Analysis software
	0.5		Sun Yongjie	Work with Postdocs and Students

The University of Science and Technology of China would participate mainly in the work related with HFT/pixel, including calibration/software development, cosmic ray test and data analysis. As for physics topics, we are interested in measuring charm production cross section, and the separation of charm and bottom production.

2.   Software Milestones

The milestones in this document are research milestones that are derived from a technically feasible project time line. We will update those milestones, as the project time line will be refined, especially by including a realistic funding profile.

The research milestones are based on the following project milestones:

TBD
TBD…