

Introduction and Workshop Goals

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(for IHEP and NJU groups)

May 24, 2019



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IHEP-NJU HGTD Interests

As presented at LAr IB meeting

- **Interested in making a large contribution to the HGTD project in general**
 - Sensor design and characterization (**on-going**)
 - Module assembly (including R&D) and stave loading
 - Bump bonding (**on-going**)
 - ASIC design (**on-going**)
 - TDAQ and Demonstrator (**on-going**)
 - Peripheral electronics
 - Test beams and irradiation (**on-going**)
 - Simulation and physics case



IHEP Accomplishments and On-Going Work

- **Sensor testing of HPK and CNM sensors**

- Did we achieve our targets and responsibilities regarding testing?
 - Leading tasks:
 - I-V, C-V: “single” probes: singles, 2x2 arrays (cold)
 - I-V: Probe card: 5x5 arrays
 - Contributing tasks:
 - TCT with Laser: 2x2 arrays
 - I-V: Probe card: 15x15 arrays
 - I-V: Breaking (X-rays)
 - ASIC Read-out
- What detector physics results have we achieved?
- Taking full advantage of the MultiRad 160 X ray irradiator in IHEP?
- 100 MeV Proton irradiation at CIAE Beijing

- **Sensor design and development**

- Two lines at IHEP: NDL plus IHEP-own designs;
- One from USTC (IHEP production line so far)

- **Test beam and corresponding data analysis**

- What detector physics results have we achieved?



IHEP Accomplishments and On-Going Work

- **Modules and staves**

- Assembled mini-modules — bump bonding
- Testing and real R&D status?
- How to organize ourselves? Resources?
- How many modules should we be promising to do at IHEP? ATLAS would like us to do 50%
- **Design of Flex cables? Staves? Plates? Timescale is NOW!**

- **Electronics**

- Contributing to ASIC design by collaboration with IFAE
- Contributing to DAQ data format specification
- Planning demonstrator
- Will we be working on the peripheral electronics? Nanjing University interested.



Clean room and equipment at IHEP

- Two main clean rooms for silicon detector project

80 m² ISO7 clean room in IHEP



150 m² ISO6 clean room in IHEP





Name	Activity	Position	FTE
Joao Guimaraes da Costa	Mngt + sensor + modules	Physics Faculty	50%
Juan Antonio Garcia	TDAQ + Demonstrator	Postdoc	30%
Jie Zhang	ASIC	Engineer	35%
Wei Wei	ASIC	Engineer	10%
Jinyu Fu	Mechanics	Engineer	30%
Yunpeng Lu	Module	Engineer	50%
Lianyou Shan	Module	Physics Faculty	70%
Feng Lv	Module	Physics Faculty	30%
MingYi Dong	Module	Engineer	30%
Xin Shi	Sensor	Physics Faculty	50%
Mei Zhao	Sensor	Engineer	50%
Ryuta Kiuchi	Sensor	Postdoc	50%
Yunyun Fan	Sensor	Postdoc	70%
Yuzhen Yang	Sensor	Postdoc	50%
Kewei Wu	Sensor	Student	50%
Yuhang Tan	Sensor	Student	50%
Liaoshan Shi	Sensor	Student	50%
Baohua Qi	Sensor	Student	70%
Zhijun Liang	Sensor + module	Physics Faculty	50%
Suyu Xiao	Sensor + test beam	Student	80%
Bo Liu	Sensor + test beam	Postdoc	30%
Mohamad Kassem Ayoub	Test beam	Postdoc	30%
Jingyi Liu	Test beam	Postdoc	30%
Kunlin Ran	Test beam	Student	30%
Xuai Zhuang	Test beam + HGTD Physics	Physics Faculty	20%
Yanping Huang	Test beam + HGTD Physics	Physics Faculty	20%
Ludovica Aperio Bella	HGTD Physics	Postdoc	30%

Physics
Faculty
7

Engineers
6

Postdocs
8

Students
6

Total: 27

Electronics
3

Module/
Mechanics
7

Sensors
13

Testbeam
Physics
8



Funding

- Trying:
 - NSFC Science Center grant, led by Yifang: 20 MRMB
 - On-going
 - ATLAS NSFC grant, led by Zhengguo Zhao: 10 MRMB
 - To apply in near future
 - Possibly future MOST fund

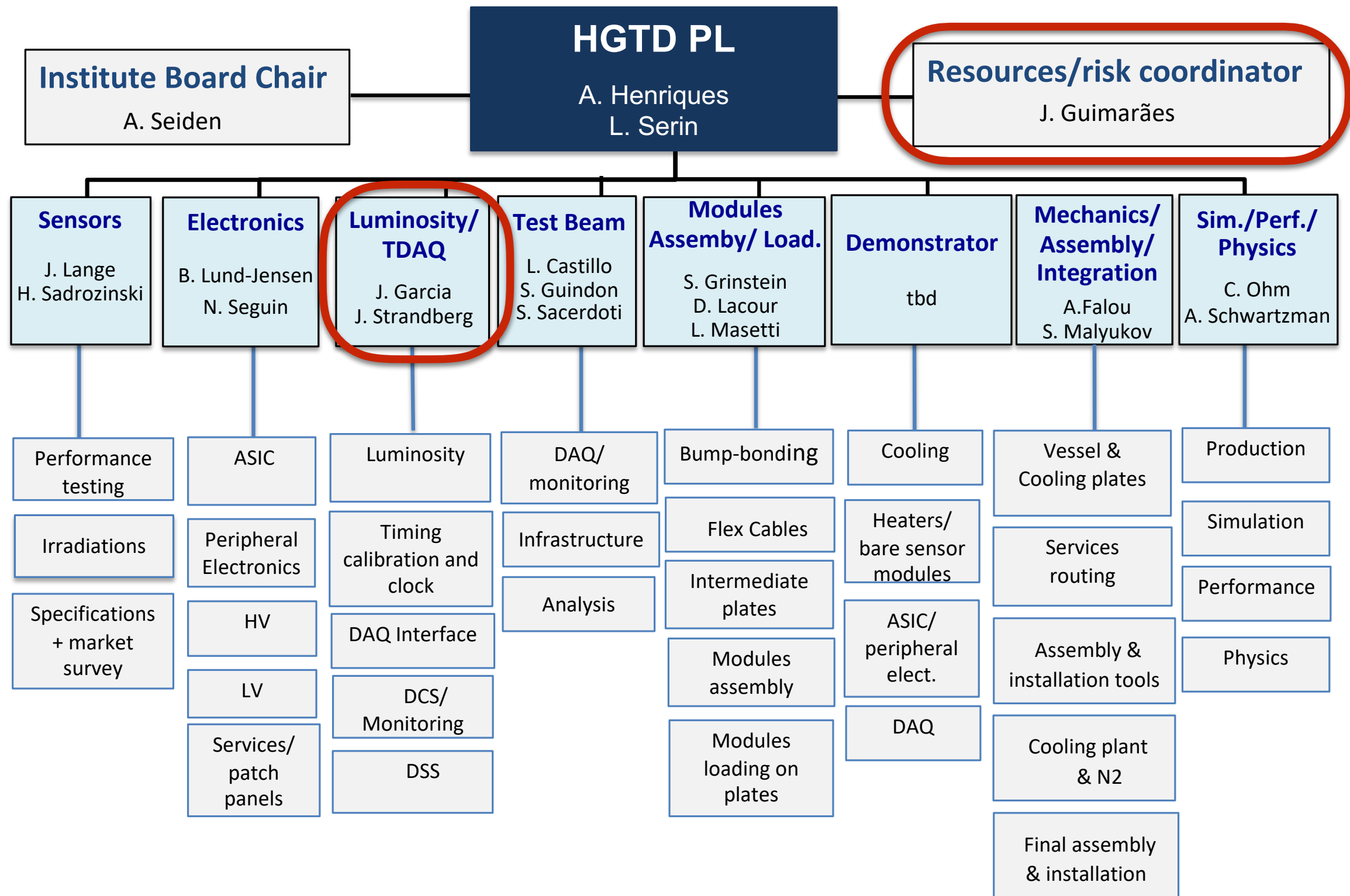


Recognition

- We aim at maximizing our recognition for the participation in the project
- Two ATLAS-level leadership positions:
 - Level 1: Resources and Risk Manager (Joao)
 - Level 2: DAQ and Luminosity Coordinator (Juan Antonio)
- Our work was already presented at the LHCC on June 4
- ATLAS Week Plenary Talk: Thursday, June 20
 - Status of HGTD, Joao
- ATLAS and HGTD talks:
 - HGTD managers are asking for 6-7 names from IHEP to prioritize for ATLAS and HGTD talks depending on their involvement on the project



Coordination tasks





Final Remarks

- Goal of workshop: Overview of the current work status and better definition of our plans for the near future
- Prepare TDR: work needs to be mostly completed by September/October
 - What can we include (sensor tests, mechanical design?)
- Timescales:
 - Feedback for next HGTD/ATLAS Week
 - TDR contributions
 - Project contributions
- Consider seriously the possibility of building a full HGTD wheel at IHEP



Backup



Nanjing University Team

Name	Activity	Position	FTE
Ming Qi	Electronics	Physics Faculty	50%
Xiaoli Ji	Electronics	Engineer Faculty	50%
to be recruited	Electronics	Postdoc	80%
Student 1	Electronics	EE Student	80%
Student 2	Electronics	EE Student	80%
Lei Zhang	Sensor + Test beam	Physics Faculty	50%
Shenjian Chen	Sensor + Test beam	Physics Faculty	30%
Shan Jin	Sensor + Test beam	Physics Faculty	10%
Liangliang Han	Sensor + Test beam	Student	40%
Bowen Zhang	Sensor + Test beam	Student	40%
Hanfei Ye	Sensor + Test beam	Student	40%
Yuhao Wang	Sensor + Test beam	Student	40%
Xiaozhong Huang	Software	Postdoc	40%

**Physics
Faculty**

4

Engineers

1

Postdocs

2

Students

6

Total: 13

- ASIC and peripheral electronics
 - Collaborating with SMU and IPAS
- Sensor test, test-beam, etc.
 - Use the facilities in NJU microstructure lab for sensor test



Electronics and ASIC

started

- **IHEP:**

- **TDAQ** (Juan Antonio Garcia coordinator) + **Demonstrator** at CERN
- **ASIC**: Working on radiation hard design of ASIC digital circuitry
 - Engineer currently in Barcelona working with Raimon, IFAE

- **Nanjing Univ:**

- Optical links and **peripheral** electronics (collaborating with SMU, IPAS)

Name	Position	FTE
Juan Antonio Garcia	Postdoc (IHEP)	30%
Jie Zhang	Engineer (IHEP)	30-40%
Xiaoli Ji	Professor EE (NJU)	50%
Ming Qi	Professor (NJU)	30%
Zhangnan Li	Student (NJU)	80%
Chang Liu	Student (NJU)	80%



Current IHEP Sensor Team

Name	Position	FTE
Joao Guimaraes	Faculty	10%
Xin Shi	Faculty	50%
Zhijun Liang	Faculty	50%
Mei Zhao	Faculty	50%
Ryuta Kiuchi	Postdoc	50%
Yunyun Fan	Postdoc	70%
Bo Liu	Postdoc	30%
Yuzhen Yang	Postdoc	50%
Suyu Xiao	Student	80%
Kewei Wu	Student	50%
Yuhang Tan	Student	50%
Liaoshan Shi	Student	50%
Baohua Qi	Student	70%

Faculty: 4

Postdocs: 4

Students: 5