

DRD4
PARTICLE IDENTIFICATION AND PHOTON DETECTORS
AFTER SOME ITERATIONS

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INFN

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DRDT 4.x

DRD4 - Particle Identification and Photon Detectors

- 4.1 - Enhance the timing resolution and spectral range of photon detectors
- 4.2 - Develop photosensors for extreme environments
- 4.3 - Develop RICH and imaging detectors with low mass and high timing resolution
- 4.4 - Develop compact high performance time-of-flight detectors
- Late start: TF4 community meeting 16-17 May 2023.
- Checkpoint at open meeting on June 15.
- Try to have a draft by end of June...
- Interaction/feedback/iterations with groups started/starting.

Writing team:

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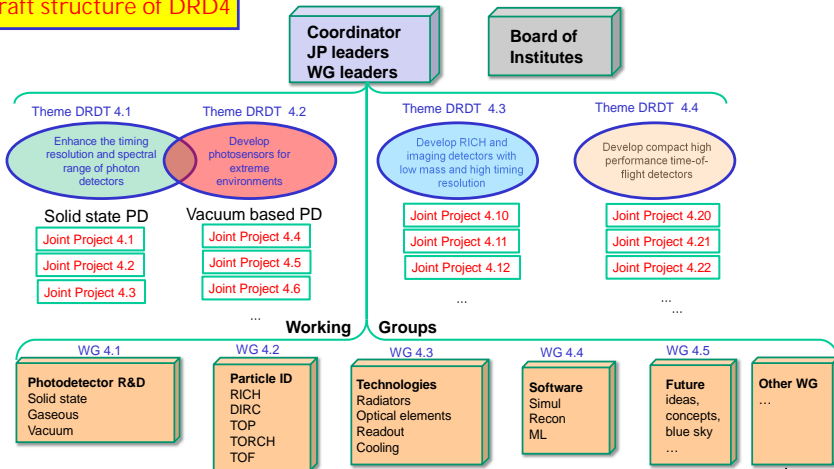
				WG					DRD4 - DRDT					approx. number of JP with double-counting						
TOTALS				-	27	18	17	12	10	-	22	12	13	9	1	28	15	21	10	
Submitter	Name of PI	JP?	COUNTRY	Group name	-	4.1 - Ph	4.2 - Pa	4.3 - Te	4.4 - So	4.5 - Sc	-	4.1	4.2	4.3	4.4	4.0	# of 4.1	# of 4.2	# of 4.3	# of 4.4
Roger Forty	Roger Forty	YES	CERN	ARC (a compact RICH detector)	-	YES	YES	NO	YES	NO	-	YES	NO	YES	NO	NO	1		3	
Eugenio Nappi	Eugenio Nappi	YES	IT	INFN Bari(2)	-	YES	YES	NO	NO	NO	-	NO	NO	YES	YES	NO			1	1
Gregory Hallowell	Gregory D Hallowell	NO	FR	CPPM(2)	-	NO	NO	YES	NO	NO	-	NO	NO	NO	NO	NO				
Do-Won Kim	Do-Won Kim	LATER	KR	Seoul National University Bundang	-	NO	NO	NO	NO	YES	-	NO	NO	NO	NO	NO				
Zhenyu Ye	Zhenyu Ye	YES	US	University of Illinois at Chicago	-	NO	NO	NO	NO	NO	-	YES	YES	NO	YES	NO	1	1		1
Florin Maciuc	Florin Maciuc	YES	RO	IFIN-HH Bucharest Romania	-	YES	YES	YES	NO	NO	-	YES	NO	YES	NO	NO	2		2	
Yuekun HENG	Yuekun Heng	YES	CN	IHEP Detector Group 3	-	YES	YES	YES	NO	YES	-	YES	NO	NO	NO	NO	1			
Matthieu Heller	Matthieu Heller	NO	CH	DPNC UNIGE	-	YES	NO	YES	YES	YES	-	NO	NO	NO	NO	NO				
Jonas Rademacker	Jonas Rademacker	YES	UK	University of Bristol	-	YES	YES	YES	YES	NO	-	YES	NO	YES	YES	NO	1		2	2
Ulrik Egede	Ulrik Egede	YES	AU	Monash University	-	YES	YES	NO	YES	NO	-	YES	NO	NO	NO	NO	1			
Imad Laktineh	Imad Laktineh	YES	FR	IP21 Lyon /IN2P3	-	YES	NO	NO	NO	YES	-	YES	NO	NO	NO	NO	1			
Jochen Schwiening	Jochen Schwiening	NO	DE	GSI	-	YES	YES	YES	YES	NO	-	NO	NO	NO	NO	NO				
Amur Margaryan	Amur Margaryan	YES	AM	AANL / Yerevan	-	YES	NO	NO	NO	YES	-	YES	NO	NO	YES	NO	1			1
Christian Pauly	K H Kampert	NO	DE	Wuppertal University	-	NO	NO	YES	NO	NO	-	NO	NO	NO	NO	NO				
Viatcheslav Sharpy	Viatcheslav Sharpy	YES	FR	CaLIPSO IRFU-CEA	-	YES	NO	NO	YES	YES	-	NO	NO	NO	YES	NO				1
Nicola Mazziotto	Nicola Mazziotto	YES	IT	INFN Bari(1)	-	YES	YES	NO	NO	YES	-	YES	YES	NO	NO	YES	1	1		
Carmelo D'Ambrosio	Carmelo D'Ambrosio	YES	CERN	CERN-EP	-	YES	YES	YES	NO	NO	-	YES	NO	YES	NO	NO	1		2	
Timothy Gershon	Gary Barker	LATER	UK	University of Warwick	-	YES	YES	NO	YES	NO	-	NO	NO	NO	NO	NO				
Claudio Gotti	Claudio Gotti	LATER	IT	University and INFN Milano-Bicocca	-	YES	NO	NO	NO	NO	-	NO	NO	NO	NO	NO				
Sara MARCATILI	Sara Marcatili	YES	FR	LPSC Grenoble	-	YES	NO	NO	NO	NO	-	YES	NO	NO	YES	NO	1			1
David Gascon	David Gascon	YES	ES	ICCUB	-	YES	NO	YES	NO	YES	-	YES	YES	YES	YES	NO	1	1	1	1
Yasar Onel	Yasar Onel	YES	US	University Iowa	-	YES	YES	YES	NO	YES	-	YES	YES	NO	NO	NO	1	1		
Roberto Calabrese	Roberto Calabrese	YES	IT	INFN Ferrara	-	YES	YES	YES	NO	NO	-	YES	YES	YES	NO	NO	2	2	1	
Phillip Urquijo	Phillip Urquijo	YES	AU	The University of Melbourne	-	YES	YES	YES	YES	NO	-	NO	YES	NO	YES	NO		1		1
Roberto Preshnell	Alessandro Montanari	YES	IT	INFN Bologna	-	YES	YES	NO	NO	NO	-	YES	YES	YES	NO	NO	1	1	1	
Antonello Di Mauro	Antonello Di Mauro	NO	CERN	CERN ALICE	-	YES	YES	YES	NO	NO	-	NO	NO	NO	NO	NO				
Sen Qian	QIAN Sen	YES	CN	IHEP-CAS-FPMT	-	YES	NO	NO	NO	NO	-	YES	NO	NO	NO	NO	1			
Antonis Papanestis	Antonis Papanestis	LATER	UK	STFC - RAL	-	YES	NO	NO	YES	NO	-	NO	NO	NO	NO	NO				
Michael McCann	Michael McCann	YES	UK	Imperial College London	-	NO	NO	YES	NO	NO	-	NO	NO	YES	NO	NO				3
Stephen Wotton	Paula Alvarez Cartelle	YES	UK	University of Cambridge	-	NO	NO	YES	YES	NO	-	NO	NO	YES	NO	NO				1
Mauro Piccini	Mauro Piccini	YES	IT	INFN Perugia	-	YES	YES	YES	NO	NO	-	YES	NO	YES	NO	NO	1			1
Roberta Cardinale	Roberta Cardinale	YES	IT	University and INFN Genova	-	YES	YES	YES	YES	NO	-	YES	YES	YES	NO	NO	2	2	2	
Rok Pestotnik	Rok Pestotnik	YES	SI	Jozef Stefan Institute	-	YES	YES	NO	YES	YES	-	YES	YES	NO	NO	NO	2	1		
Angela Romano	Angela Romano	LATER	UK	University of Birmingham	-	YES	NO	NO	NO	NO	-	NO	NO	NO	NO	NO				
Claudia Hoehne	Claudia Hoehne	LATER	DE	Justus Liebig University Giessen	-	NO	NO	YES	NO	NO	-	NO	NO	NO	NO	NO				
Etiennette Auffray	Etiennette Auffray	LATER	CERN	CERN	-	YES	NO	NO	NO	YES	-	NO	NO	NO	NO	NO				
Fulvio Tessoratto	Fulvio Tessoratto, Silvia I	YES	IT	INFN Trieste	-	YES	YES	YES	YES	NO	-	NO	NO	YES	NO	NO				1
Peter Hobson	Jon Hays	YES	UK	Queen Mary University of London	-	YES	YES	NO	NO	NO	-	NO	YES	NO	NO	NO				1
Franz Muheim	Silvia Gambetta	YES	UK	University of Edinburgh	-	YES	YES	YES	NO	NO	-	YES	YES	NO	NO	NO	1	1		
Peter Dendooven	Alexander Gerbershagen	NO	NL	UMCG PARTREC Groningen	-	YES	NO	YES	NO	NO	-	NO	NO	NO	NO	NO				
Ezio Torassa	Ezio Torassa	YES	IT	INFN Padova(1)	-	YES	YES	NO	NO	NO	-	YES	NO	NO	NO	NO	2			
Gabriele Simi	Gabriele Simi	YES	IT	INFN Padova(2)	-	YES	YES	YES	NO	NO	-	YES	YES	NO	NO	NO	2	2		
Christian Morel	Morel	YES	FR	CPPM	-	NO	NO	NO	YES	NO	-	NO	NO	NO	YES	NO				1
Guy Wilkinson	Guy Wilkinson	LATER	UK	University of Oxford	-	YES	YES	YES	NO	NO	-	NO	NO	NO	NO	NO				

- Many JP proposals appear to be just a (sometimes long) list of "to-do".
- Some JP proposals have a well-defined target.
- Some JP proposals appear to have very broad targets.
- There is seldom any time-scale.
- In some cases, proto-collaborations already existing have submitted as one group; in other cases, each group (or some groups) have duplicated similar submissions.
- There are attempts to build a synergical collaboration among different groups!
- We have no information on the number of full-time equivalent expected, yet.

- We tried to follow as much as possible the INFN excel table.....
- Working Groups and DRDT (DRD "Themes") are somewhat two orthogonal axes.
- Working Groups: free forum, free entrance/exit, largest possible communities, no formalities, exchange among the full community; kind of *social network*...
- DRDT are roots of a tree having as leaves Joint Projects == Work Packages, possibly split into tasks, as leaves.
Tasks have milestones, deliverables, institutions, money, FTE.....
- DRD4: has four DRDT (= DRD Themes)
 - ▶ DRDT 4.1 - Enhance the timing resolution and spectral range of split into Joint Projects (== Work Packages)
 - ★ JP4.1.1: ? fast SiPM ?...
 - ★ JP4.1.2: ? fast long-life MCP ?...
 - ★ JP4.1.3:... whatever
 - ★ ?...? Each one, possibly split into TASKS
 - JP4.1.1.1:... whatever.1
 - JP4.1.1.2:... whatever.2
 - ...

from Christian Joram

Draft structure of DRD4



DRDT 4.1 & DRDT 4.2 - PRELIMINARY

- DRDT 4.1 Solid State Photo-Detectors: SiPM, SPAD,..
 - ▶ 4.1.1: New configurations and new modes SSPD This includes ultra-granular, IBS and digital SiPM
 - ▶ 4.1.2: Radiation hardness This concerns the SSPD radiation hardness in different harsh conditions
 - ▶ 4.1.3: Cryogenics SSPD Characterization of SSPD in very low temperature conditions
 - ▶ 4.1.4: Timing performance Study of SSPD timing performances using appropriate readout electronics
- DRDT 4.2 Vacuum Photo-Detectors: MCP, LAPPD, PMT, NCP,...
 - ▶ 4.2.1: VPD: New material, new coatings, longevity and rate capability study. This concerns the RD on new materials to produce VD, new shapes and new coatings and their consequences on their longevity and rate capability
 - ▶ 4.2.2: VPD-PMT: New photocathode materials, structure and high quantum efficiency VD New photocathode materials, new structures and their impact on improving the quantum efficiency for different wave lengths

DRDT 4.3 - PRELIMINARY

- JP - **New Materials, Radiators and Components for RICH detectors.**
- JP - **Next RICH detectors** (less than ten years): might be split in tasks:
 - ▶ JPT - **new detector concepts**
 - ▶ JPT - **f/e**
 - ▶ JPT - **detector development and design**
 - ▶ JPT - **ancillary systems for characterization/calibration/alignment/monitoring.**
- JP - **Far future (more than 10 years), Blue-Sky.** == after the next RICH detectors: more than ten years
- JP - **Software**
- **Place-holder for -**
SiPM, MCP and other sensors for RICH / interface with DRDT1/DRDT2

DRDT 4.4 - PRELIMINARY

MISCELLANEA - TO BE CHECKED WITH AGENCIES

- Some companies on-board (FBK, Hamamatsu, Photonis) others are being contacted. Status different from scientific groups.
- Membership fees for groups participating in JP activities / board of institutes: 500-1000 CHF/year/group.
- No mutualization of funds, no common funds for research.
- For INFN: we assume group==Sezione/Lab.

END

- Some critically important "themes" seem to be missing from the submissions: we are starting to look around to invite expert people/groups.
- Some concerns that in some cases proposed JP are limited to one experiment: to be fixed to target the goal of the process of developing synergies and exchanging competences,...
- A form to compile for JPs (similar to the INFN excel table) is being submitted to project leaders of the groups.
- Contact Christian for any question/interest/.../.../...