

# JRA10:CryPTA

## Cryogenic Polarized Target Applications

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# JRA10:CryPTA

## Cryogenic Polarized Target Applications



### Cooperation of four partners



Organization legal name	Short name	Activity leaders
Ruder Boskovic Institute	RBI	M. Korolija
Ruhr-Universität Bochum	RUB	G. Reicherz
Rheinische Friedrich-Wilhelms-Universität Bonn	UBO	H. Dutz
Johannes Gutenberg Universität Mainz	UMainz	A. Thomas



### Research Objectives

The final goal of CryPTA is to develop groundbreaking s.c. magnet structures and low temperature detector techniques for new and innovative polarization experiments using polarized targets in  $4\pi$ -detection systems for hadron physics experiments in Europe

# JRA10:CryPTA

## Tasks of WP28 (from Annex I)

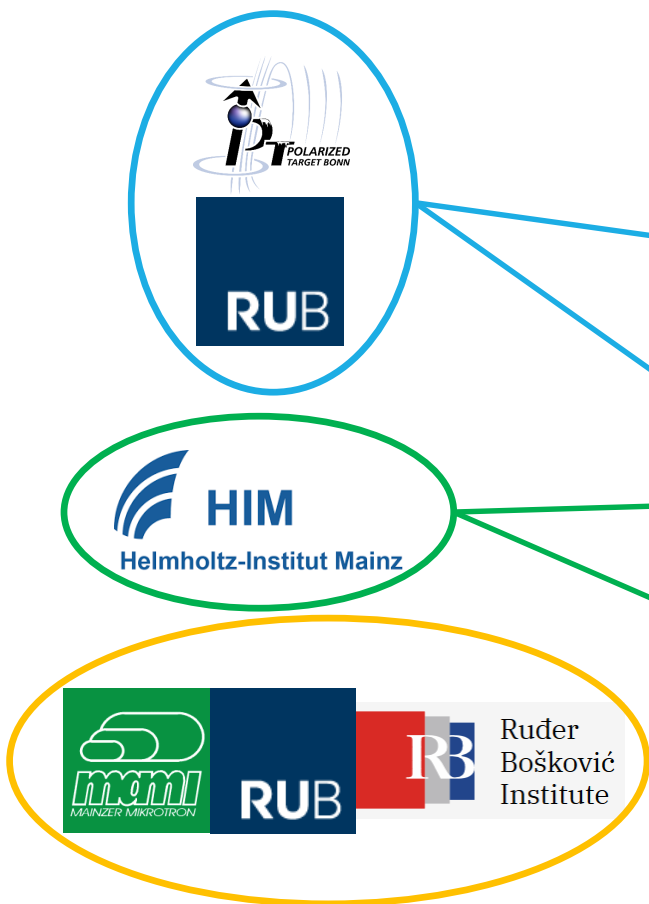
PART B – Section 3. Implementation

### 3. IMPLEMENTATION

#### 3.1.2 TIMING OF THE DIFFERENT WORK PACKAGES AND THEIR COMPONENTS

Work package number	JRax																
Work package acronym	CryPTA																
Work package title	Cryogenic Polarized Target Applications																
TASKS/Subtasks	Year 1				Year 2				Year 3				Year 4				
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
<b>1. Development of low mass superconducting high field magnets</b>																	
1.1 High precision winding machine for thin superconducting wires			1														
1.2 Manufacture and test of a small size low mass polarizing solenoid with high homogeneity																	
1.3 Design manufacture and cold test of a prototype low mass, combined field superconducting magnet system										2							
1.4 Magnet field design studies for a low mass large sc. tracking solenoid																	
<b>2. Development of low mass superconducting passive shielding</b>																	
2.1 Magnet field calculations for PANDA low mass superconducting passive shielding													3				
2.2 Design and Manufacture of prototype HTSC shields and test at cryogenic temperatures																	
<b>3. Detection of recoil particles in active polarized targets at cryogenic temperatures</b>																	
3.1 Design studies for polarized, scintillating target material																	
3.2 Prototypes of a scintillating target stacks with electronic readout														4			
3.3 Prototype of a new cryogenic insert with active target material																	

(Timelines are indicate in grey, milestones with black boxes)



# JRA10:CryPTA

## List Milestones and human resources

### List of Milestones in the reporting period (year1, Q1-Q4, 06.2019-06.2020)

Milestone number	Milestone name	Lead beneficiary	Delivery month from Annex I	Delivered (yes/no)	Actual delivery month	Comments
MS63	High precision winding machine for thin superconducting wires	10 - UBO	9	yes	8	A detailed description of the winding machine is given in: <a href="https://www.polarisiertes-target.physik.uni-bonn.de/files/internalreportmilestonewindingmaschine.pdf">https://www.polarisiertes-target.physik.uni-bonn.de/files/internalreportmilestonewindingmaschine.pdf</a>

### Use of human resources in the reporting period (year1, Q1-Q4, year2, Q1-Q2, 06.2019-12.2020)

Beneficiary number	Organization legal name (in italics the Research Units)	Short name	Human effort from Annex I (person-months for 18 months)	Actual human effort in the reporting period (person-months)
9	Johannes Gutenberg-Universität Mainz	JGU MAINZ	3,40	0,00
10	Rheinische Friedrich-Wilhelms-Universität Bonn	UBO	7,50	0,00
25	Ruder Boskovic Institute	RBI	0,00	0,00

Use of financial resources in the reporting period: ~ 11K€ for instrumentation at UBO

No Deliverables in the reporting period

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## List Milestones and human resources

### List of Milestones in the period 2021/2022 (year3, Q1-Q4)

Milestone number	Milestone name	Lead beneficiary	Delivery month from Annex I	Means of verification	Actual delivery month	Comments
MS64	Design concept of a low mass, combined field superconducting magnet System	10 - UBO	27	Internal Report		
MS65	Magnet field calculations for PANDA low mass superconducting passive Shielding	10 - UBO	27	Internal Report		
MS66	Manufacture of prototype active targets for in beam tests	10 - UBO	27	Internal Report		

Budget corrections:

JRA10: CryPTA – Cryogenic polarized target applications							
REQUESTED EC CONTRIBUTION PER BUDGETARY ITEM AND PER BENEFICIARY							
Contr. No	Participant Acronym	Personnel (EUR)	Other costs (durables, consumables, travel, workshops) (EUR)	Total direct costs (EUR)	Indirect costs (EUR) (25%)	Total costs (EUR)	Requested EC contribution (EUR)
	CUNI	0	0	0	0	0	0
11	RUB	0	12 000	12 000	3 000	15 000	15 000
10	UBO	88 000	28 000	116 000	29 000	145 000	145 000
9	JGU Mainz	40 000	20 000	60 000	15 000	75 000	75 000
25	RBI	<del>10 000</del>	2 000 <b>12 000</b>	12 000	3 000	15 000	15 000
	<b>TOTAL</b>	<b>138 000</b>	<b>62 000</b>	<b>200 000</b>	<b>50 000</b>	<b>250 000</b>	<b>250 000</b>

### Research Objectives

The final goal of CryPTA is to develop groundbreaking s.c. magnet structures and low temperature detector techniques for new and innovative polarization experiments using polarized targets in  $4\pi$ -detection systems for hadron physics experiments in Europe

Despite the currently unfavorable circumstances: the 3 Tasks are on the right track

- Task 1: → completing the magnet test refrigerator.
  - preparing the manufacture and test of a small size low mass polarizing solenoid with high homogeneity.
- Task 2: → Magnet field calculations for PANDA low mass superconducting passive shielding still ongoing.
- Task 3: → development of low temperature polarized active targets is on the way.
  - next step is the preparation of an improved target insert implementing the knowledge we have collected in the last years.

But: Corona also seems to slow down (thwart?) JRA10  
So: lets hope the best