

表 1

单一来源采购单位内部会商意见表（一）

中央预算单位	中国科学院近代物理研究所
采购项目名称	HIAF 6.6kW@4.5K, 2.1kW@2K 液氮制冷机联调阶段现场技术服务人工时
采购项目预算（万元）	97.29079
拟采用采购方式	单一来源采购
<p>采购项目概况、拟采用采购方式的理由、供应商(制造商及相关代理商)名称及地址</p> <p>采购项目概况：</p> <p>HIAF 项目从法液空采购的 6.6kW@4.5K, 2.1kW@2K 液氮制冷机，其用途是为 HIAF 超导直线加速器低温模组提供运行所需的冷量和低温状态控制。2025 年 5 月 12 日该套液氮制冷机已通过现场测试验收，验收合格。</p> <p>制冷机自 2025 年 6 月 2 日开始与超导直线加速器低温模组进行联合调试，包括低温降温、2K 运行及低温状态控制等。</p> <p>因联调期间制冷机负载变化剧烈，与制冷机验收阶段稳定负载会有很大不同，故需要制冷机生产厂商法液空在 2025 年 6 月 2 日至 2025 年 7 月 2 日为期一个月联调期间，提供技术服务，以保证联调顺利进行。</p> <p>为此，项目组经与法液空商定，需要与液化空气安法科（上海）贸易有限公司（以下简称安法科）签订技术服务合同，由法液空和安法科在联调期间共同提供技术服务，技术服务收费标准如下：安法科国内工程师技术服务人工时 8470 元/天；法液空国际工程师技术服务人工时 24448 元/天。</p> <p>现经核算，联调期间产生人工工时如下：安法科国内工程师合计为 10.86 天，法液空国际工程师合计为 33.78 天，总计技术服务人工时费为 97.29079 万元（含 6%VAT），详见核算清单。</p> <p>本项目因制冷机属法液空专属设备，国内无第二家厂家可以提供联调技术服务，只能采用单一来源的方式采购法液空 6.6kW@4.5K, 2.1kW@2K 液氮制冷机现场联调技术服务人工时。</p>	
使用部门负责人签字	牛小飞
联系电话	18509316240

说明：1.对采购限额以上公开招标数额标准以下，需要直接采用单一来源采购方式的采购项目，需在采购前填写此表。

2.此表除使用部门负责人签字外，其他内容均用计算机打印。

表 2

单一来源采购单位内部会商意见表（二）

中央预算单位	中国科学院近代物理研究所
采购项目名称	HIAF 6.6kW@4.5K, 2.1kW@2K 液氮制冷机联调阶段现场技术服务人工时
采购项目预算（万元）	97.29079
拟采用采购方式	单一来源采购
<p>2021 年，研究所与 Air Liquide Advanced Technologies（以下称法液空）和液化空气安法科（上海）贸易有限公司（以下简称安法科）签订技术协议（合同号 IMPCG20210023）和技术服务合同（合同号 IMPCG20210022），为 HIAF 项目采购 1 套 6.6kW@4.5K, 2.1kW@2K 液氮制冷机，通过其给 HIAF 超导直线加速器低温模组提供运行所需的冷量和低温状态控制。该套液氮制冷机 2025 年 5 月 12 日通过 HIAF 项目现场测试验收，验收合格。</p> <p>2025 年 6 月 2 日起，该套制冷机开始与 HIAF 超导直线加速器低温模组进行联调。考虑联调期间制冷机负载与制冷机验收阶段的稳定负载会有很大不同，需要制冷机生产厂商法液空提供技术服务。经项目组与法液空讨论商定，与液化空气安法科（上海）贸易有限公司（以下简称安法科）签订技术服务合同，技术服务收费标准为：安法科国内工程师技术服务人工时 8470 元/天；法液空国际工程师技术服务人工时 24448 元/天。</p> <p>现经核算，安法科工程师联调期间技术服务人工时合计为 10.86 天，合计人工时费用为 9.19842 万元；法液空工程师联调期间技术服务人工时合计为 33.78 天，合计人工时费用为 82.585344 万元，以上安法科和法液空总计人工时费为 97.29079 万元（含 6%VAT），详见核算清单。</p> <p>本项目因制冷机属法液空专属设备，国内无第二家厂家可以提供联调技术服务，所以将采用单一来源的方式采购法液空 6.6kW@4.5K, 2.1kW@2K 液氮制冷机联调技术服务人工时。</p> <p>供应商名称：液化空气安法科（上海）贸易有限公司 供应商地址：上海市外高桥保税区港澳路 239 号 2 幢 224 室 联系人：颜兴/13861956514</p>	
政府采购归口管理部门负责人签字	梁晋洁
财务部门负责人签字	梁晋洁
科研管理部门负责人签字	王思成
使用部门负责人签字	牛小飞

说明：1.对采购限额以上公开招标数额标准以下，需要直接采用单一来源采购方式的采购项目，需在采购前填写此表。

2.此表除相关部门负责人签字外，其他内容均用计算机打印。

2025年6月2日-6月8日

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		Site intervention				
Project name	HIAF	Week	23	Equipment	LHe liquefier	
Project number	1004854	From	02/06/2025			
Location	Huidong, China	To	08/06/2025			

Time Sheet						
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		Activity	Raphaël	Yoann	Glen	Jo (ATC)	Comments
			Hours	Hours	Hours	Hours	
Monday	02/06/2025	Tech. Assistance		8			
Tuesday	03/06/2025	Tech. Assistance		8	8		
Wednesday	04/06/2025	Tech. Assistance		8	8		
Thursday	05/06/2025	Tech. Assistance		8	8		
		Punch point				8	
Friday	06/06/2025	Tech. Assistance		8	8		HIAF started producing liquid with the coldbox. Rupture disc burst in the tunnel on the 4K line
		Punch point				8	
Saturday	07/06/2025						
Sunday	08/06/2025						
Total		Tech. Assistance	0	40	32	0	72
		Punch point	0	0	0	16	16
		Training	0	0	0	0	0
		Travel	0	0	0	0	0

General comments:	<p>Cold box cooldown was started on May, 26 2025. Training period 1 week included in the commissioning contract from Monday 26/05 to Friday 30/05 . PDF training slides were provided to HIAF team via mail to Mr. Niu Technical assistance period started on Monday June 2nd including 2 Alat supervisors during 5 days/week</p>
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ALAT		Customer approval	
Date		Date	
Visa	Glen PHILIPPOT 	Visa	

2025 年 6 月 9 日-6 月 15 日

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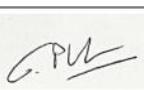
	Site intervention	
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Project name	HIAF	Week	24	Equipment	LHe liquefier
Project number	1004854	From	09/06/2025		
Location	Huidong, China	To	15/06/2025		

Time Sheet

	Activity	Raphaël	Yoann	Glen	Jo (ATC)	Comments
		Hours	Hours	Hours	Hours	
Monday 09/06/2025	Tech. Assistance		8	8		
	Punch point				8	
Tuesday 10/06/2025	Tech. Assistance		8	8		
	Punch point				8	
Wednesday 11/06/2025	Tech. Assistance		8	6	8	Servomex analyser calibration
	Punch point			2		
Thursday 12/06/2025	Tech. Assistance		8	8	6.88	
Friday 13/06/2025	Tech. Assistance		6	6		Servomex analyser sequences check
	Punch point		2	2		
Saturday 14/06/2025						
Sunday 15/06/2025						
Total	Tech. Assistance	0	38	36	14.88	88.88
	Punch point	0	2	4	16	22
	Training	0	0	0	0	0
	Travel	0	0	0	0	0

General comments:	Customer lines & cryomodules cooldown. WCS + coldbox trip on Tuesday after rupture discs blow off. Restart by HIAF team. ESD stop training experience checked Helium delivery +4000 Nm3 on Friday
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ALAT		Customer approval	
Date		Date	
Visa	Glen PHILIPOT 	Visa	

2025年6月16日-6月22日

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	Site intervention	
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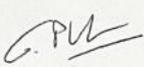
Project name	HIAF	Week	25	Equipment	LHe liquefier
Project number	1004854	From	16/06/2025		
Location	Huidong, China	To	22/06/2025		

Time Sheet						
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	Activity	Raphaël	Yoann	Glen	Jo (ATC)	Comments
		Hours	Hours	Hours	Hours	
Monday	16/06/2025	Tech. Assistance	8	8		
Tuesday	17/06/2025	Tech. Assistance	8	8		
Wednesday	18/06/2025	Tech. Assistance		8		
		Travel	8			
Thursday	19/06/2025	Tech. Assistance		8		
		Travel			8	
Friday	20/06/2025	Tech. Assistance		8	8	
Saturday	21/06/2025					
Sunday	22/06/2025					

Total	Tech. Assistance	0	16	40	8	64
	Punch point	0	0	0	0	0
	Training	0	0	0	0	0
	Travel	0	8	0	8	16

General comments:	Test of cryomodules ongoing CB trip on 17/06 midnight due to instabilities in the tunnel modules (3 trips in 1 hour on each turbine) Started again at 7AM. Rest of the week stable with re-stabilized temperature map 4K ready for the Weekend
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ALAT		Customer approval	
Date		Date	
Visa	Glen PHILIPPOT 	Visa	

2025年6月23日-6月29日

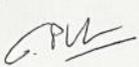
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		Site intervention				
Project name	HIAF	Week	26	Equipment	LHe liquefier	
Project number	1004854	From	23/06/2025			
Location	Huidong, China	To	29/06/2025			

Time Sheet						
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	Activity	Raphaël	Yoann	Glen	Jo (ATC)	Comments	
		Hours	Hours	Hours	Hours		
Monday	23/06/2025	Tech. Assistance			8	8	Night shift due to late helium delivery. In the morning, ALAT accepted to come back in the evening to assist during ZK unit start-up by customer
Tuesday	24/06/2025	Tech. Assistance			8	8	Breakage of turbine 2 during the night ; after warming-up, turbine was changed during the afternoon and restarted satisfactorily. ZK unit remained stopped
Wednesday	25/06/2025	Tech. Assistance			8	8	Most HIAF team out for meeting. Plant is kept stable by operators
Thursday	26/06/2025	Tech. Assistance			8	8	Idem
Friday	27/06/2025	Tech. Assistance			8	8	
Saturday	28/06/2025						
Sunday	29/06/2025						
Total	Tech. Assistance	0	0	40	40	80	
	Punch point	0	0	0	0	0	
	Training	0	0	0	0	0	
	Travel	0	0	0	0	0	

General comments:	<p>Several failures during Monday to Tuesday night when activating the ZK :</p> <ul style="list-style-type: none"> - Turbine 2 breakage (machine replaced, old unit to be sent to ALAT for repair) - Followed by a coldbox trip during the night - for different reason (LT-3286 overfill) - Kaiser was found with low oil level tripped on C2540A, to be refilled by customer. - Leybold PVPS 6 overtemperature (found machine internal limited water flow) <p>Helium delivery +3600 Nm3 on Monday</p>
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ALAT		Customer approval	
Date		Date	
Visa	Glen PHILIPPOT 	Visa	

2025年6月30日-7月6日

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		Site intervention				
Project name	HIAF	Week	27	Equipment	LHe liquefier	
Project number	1004854	From	30/06/2025			
Location	Huidong, China	To	06/07/2025			

Time Sheet						
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	Activity	Raphaël	Yoann	Glen	Jo (ATC)	Comments	
		Hours	Hours	Hours	Hours		
Monday	30/06/2025	Tech. Assistance			8	8	Start-up of 2K. Problems noticed with the reaction of cold compressors section, subject to surge events
Tuesday	01/07/2025	Tech. Assistance			8	8	2 K cool down continues until problems occurred repeatedly with rupture discs in the tunnel. 2K section of coldbox is stopped. Unexplained pressure rises disturbed the lines P14483 & 4489 up to 7 bar ! Turbine 3 experienced filter clogging, due to solidified gas -> back in service
Wednesday	02/07/2025	Tech. Assistance			8	8	Pressure pikes still occurred during the night. 2K was restarted. CV3489 closed to 8% : problem seems to have changed location and no longer happening in the tunnel but on this valve. ALAT suggest there is high pollution rate in the He, and it needs purifying before continuing
Thursday	03/07/2025				4.24		
Friday	04/07/2025						
Saturday	05/07/2025						
Sunday	06/07/2025						
Total		Tech. Assistance	0	0	28.24	24	52.24
		Punch point	0	0	0	0	0
		Training	0	0	0	0	0
		Travel	0	0	0	0	0

General comments:	<p>2K tests ongoing during the 3 days Some problems identified regarding pressure pikes causing rupture discs failure on the 4K line. First investigations give potential explanation due to pollution of the gas. Linde analyser tested and coherent. ALAT suggest to purify the gas circuit (WCS, CB & cryomodules) before continuing . Risk exists to damage the equipments, especially rotating machines</p>
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ALAT		Customer approval	
Date		Date	
Visa	Glen PHILIPPOT 	Visa	