



Dark Matter Axion Group: Present and Future

DMAG Mini-workshop

2026.02.11

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Dark Matter Axion Group (DMAG)

Institute for Basic Science (IBS)



Accomplishments

- *Search results*

- *Axion Dark Matter Search with Sensitivity near the Kim-Shifman-Vainshtein-Zakharov Benchmark Using the TM_{020} Mode (Phys.Rev.Lett. **135**, 091804)*
 - [Featured in IBS & domestic media](#)
- *Probing Kim-Shifman-Vainshtein-Zakharov Axion Dark Matter near 5.9 GHz Using an 8-Cell Cavity Haloscope (Phys.Rev.Lett. **135**, 211801)*
 - [Featured in IBS & domestic media](#), invited to IBS Director's meeting
- *First dedicated search for axion-quark-nugget dark matter (Phys. Rev. D **112**, L121305)*

- *R&D result*

- *Multi-JPA configuration to broaden amplification bandwidth for axion haloscope experiments (Supercond. Sci. Technol. **39** 025011)*

- *IBS Art in Science*

- [Fetal Movements of an Axion](#)

- *Korea Science and Technology Expo*

- *TM_{020} and 8-cell cavities*



Current status

- *All systems are in operational mode!*
 - *8T: axion search (3.7-40 GHz)*
 - *8TB: bolometer measurement, 8-cell cavity in assembly*
 - *12T: axion search (4.98 GHz)*
 - *12TB: axion search (1.3-1.5 GHz)*
 - *BF4: JPA characterization*
- *Recent few weeks ... Makes our success promising*
 - *40 hours / week*
 - *Late nights / weekends*
 - *Harder work (research engineers)*



Plan for next 4 years

- *Basic strategy*
 - **Transition from R&D stage to DAQ stage**
 - *Major efforts on search experiment and minor efforts on R&D*
- *Complete coverage up to 6 GHz (some up to 10 GHz)*
 - *Full use of available JPAs*
 - *Integration of HTS cavities*
 - *Implementation of high-frequency cavity designs*
- *Development of next generation of quantum sensors*
- *Assume that we have only 3 years*
 - *Each experiment team is expected to*
 - **Scan > 400 MHz/year**
 - **Publish > 1 search paper/year** (PRL and equivalent preferred)
 - *Each research (QNA) team is expected to*
 - **Publish > 1 R&D paper/year**



Budget

- *1,500M KRW/year is **fixed** for CI groups*
- *(Original) plans for 2026*
 - *Labor: 950M KRW (two postdocs)*
 - **Electricity: 200M KRW**
 - *Material & fabrication: 250M (cryogen, cavities, RF components)*
 - *R&D activities: 100M KRW (consulting fee)*
 - *No maintenance!*
- *Uncertain expenses (within our budget)*
 - *Rental fee: 150M + 150M KRW*
 - *Electricity (2025): 200M KRW*
 - *Relocation to HQ: 300M (construction) + 200M KRW (moving)*

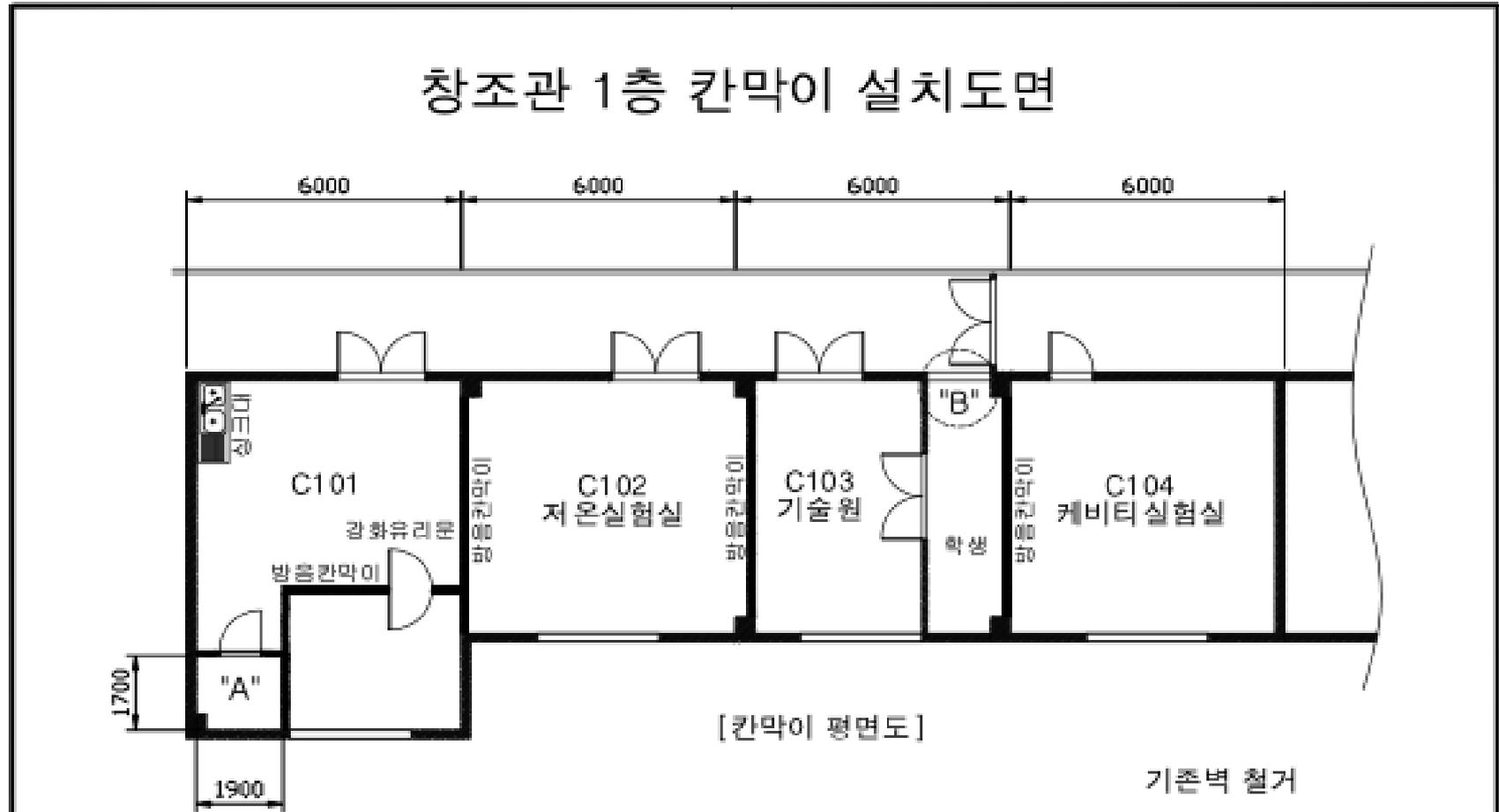


Relocation

- *To 1st floor*
 - *Construction for office space: late Feb. ~ early Mar.*
 - *Floor (C106), electricity (C104), firefighting: late Feb.*
 - *2nd item moving & disposal: mid Mar.*
 - *Office relocation: late Mar.*
 - *3rd item moving & disposal*
- *To HQ*
 - *Approval from the new president is required*
 - *Hope in Dec. 2026*



Construction layout



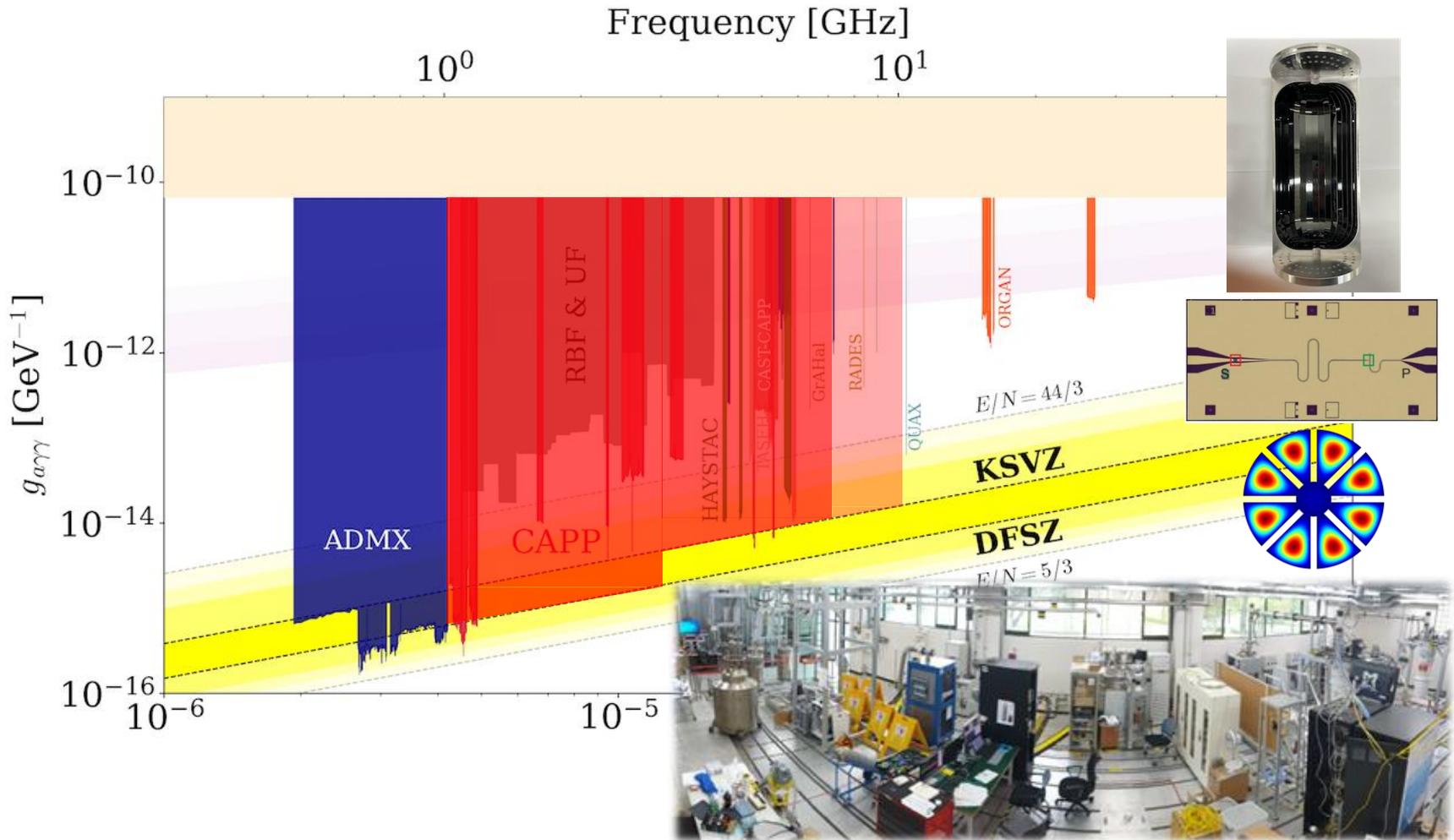


Recent update

- *New president*
 - *2nd round of election process*
 - *Inauguration in June*
- *UST students*
 - *Likely to be available starting in Sep. 2026*
 - *2.5M KRW/month*



Plan for next 4 years





Slack

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Where work happens | Slack

purchase (Channel) - IBS-DMAG - Slack

Search IBS-DMAG

IBS-DMAG

- Drafts & sent
- Home
 - Experiments
 - # case-12t
 - # case-12tb
 - # case-8t
 - # case-8tb
 - # data-analysis
- DMs
- Activity
- Projects
 - # cryogenics
 - # high-frequency
 - # hts-cavity
 - # quantum-sensing
- Later
- More
- Admin
 - General
 - # et-cetra
 - # life-in-dmag
 - # notice
 - # purchase
 - # simulation
 - Odds and Ends
 - # friedhelm-scanner

purchase 12

Messages Add canvas Files +

SungWoo youn 5:38 PM
Please use this channel for procurement-related co Yesterday to keep a proper record.

Heejun Park 6:56 PM
LHe 500L Quotation, 월드에너지스
PDF

2025.04.22^견적서_액체헬륨 500리터_월드에너지스... PDF

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Today

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Message #purchase

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Google calendar

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calendar.google.com

Google Calendar - April 2025

Calendar Today < > April 2025

+ Create

April 2025

S M T W T F S

30 31 1 2 3 4 5

6 7 8 9 10 11 12

13 14 15 16 17 18 19

20 21 22 23

27 28 29 30

4 5 6 7

Search for p

My calendars

- SungWoo Youn
- Academic event
- Away
- Birthdays
- Family
- Meeting
- Tasks

Other calendars

SUN 30	MON 31	TUE Apr 1	WED 2	THU 3	FRI 4	SAT 5
	10:30am DMAG v		[Saebyeok] Military 3pm [swyoun] Ct 4:30pm CUP sem	2pm [swyoun] KSNU 11:30am 12T mee		Arbor Day
6	10:30am DMAG v 11am [swyoun] S	[swyoun] TTC2025 Meeting 6pm [swyoun] Cc	4:30pm CUP sem	11:30am 12T mee		
		5pm [swyoun] EA	4:30pm DMAG se			
20	[Saebyeok] Military 8:30am [swyoun] 10:30am DMAG v	11am Training on 1:30pm [swyoun] 3pm KPS practice	23 KPS meeting	[Taehyeon] Risk Assessment Training 11:30am 12T mee	CUBES-7 workshop [Jiwon] 2025 KPS S	
27	CUBES-7 workshop [Jiwon] 2025 CUBES Workshop 10:30am DMAG v 5:30pm [swyoun]	4pm IBS colloqui 5pm [swyoun] M	3:30pm [swyoun]	May 1 Labor Day 11:30am 12T mee	[Jiwon] Military training [Heejun] off	

Special/urgent events are scheduled according to the schedule shown on the calendar.



Working better together

- *Break the “my way” habit*
- *“Different” is not “Wrong”*
- *Respect is not optional*
- *Let us focus on solutions, not personal feelings*
- *We are on the same boat. We need to work together to keep it from sinking...*



Conclusion

- *We have learned so much over the past 10 years*
 - *Now, we know what to do and how to do*
- *Our situation is very tough*
 - *Reduced budget, fewer people, space constraints, ...*
- *Your individual contribution matters more than ever*
 - *Unique expertise and experience will make a difference*
- *Let us get it done together!*
 - *Help each other, respect each other, and move forward together*
 - *Make sure we do it in the right way!*