

Request for independent space for dedicated VITO laser system

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Existing situation

2016-2022:

- VITO used only VIS and IR light via optical fiber from COLLAPS laser laboratory
- Using VITO pump laser + COLLAPS tunable laser (when not in use by COLLAPS)
- Access to COLLAPS laser lab: when COLLAPS is not running and MIRACLS not setting up or running

=> this arrangement worked because VITO needed only pump + tunable VIS or IR laser with 'easy' wavelenghts

REASONS for CHANGE

1. VITO will investigate elements requiring (i) **longer setup time** and (ii) **free optical path** (because UV or/and powers above fiber damage level):

- 11Be, approved Feb23, UV @ 313 nm
- 47,49,51K, approved Feb23, IR@766 nm (for max polarisation -> power above fiber threshold)
- 31,33Mg: other cases in VITO ERC project, UV@280 nm
- 49,51,53Ca: other cases in ERC project, UV/VIS around 400 nm + IR around 800 nm
- Other cases planned: In, Cd, Cu – 2 laser-pumping or/and UV

- **Impact:**

- Free path from COLLAPS lab to VITO very difficult
- VITO laser schemes require more setup time, not any more feasible in COLLAPS lab

REASONS for CHANGE

2. ERC grant allowed to purchase more lasers for VITO. System now: pump laser, tunable laser, frequency doubler

- **Impact:**

- With COLLAPS system also expanding (2 pump, 3 tunable lasers, 3 doublers) not enough space for VITO lasers in COLLAPS laser lab

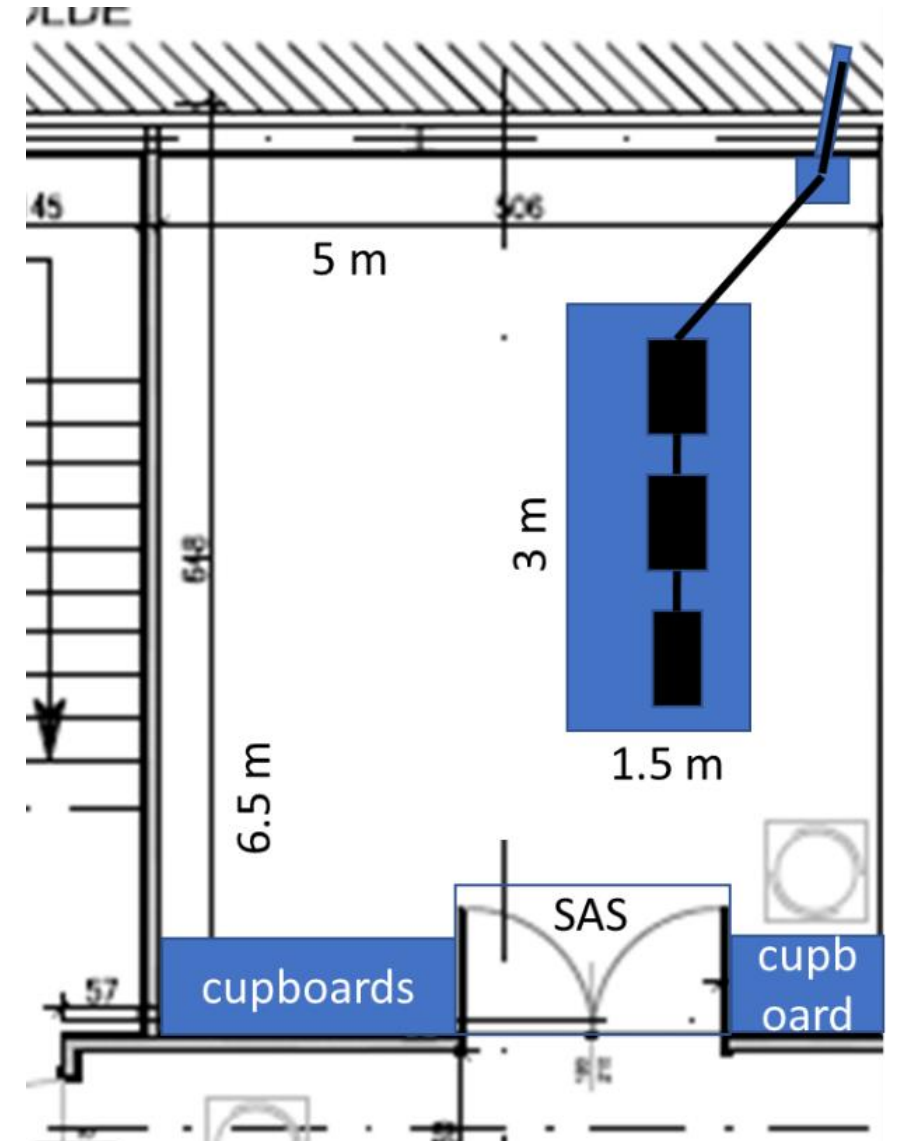
3. MIRACLS proof-of-principle setup that occupied 508-R-015 (aka detector lab) for several years moves out this spring

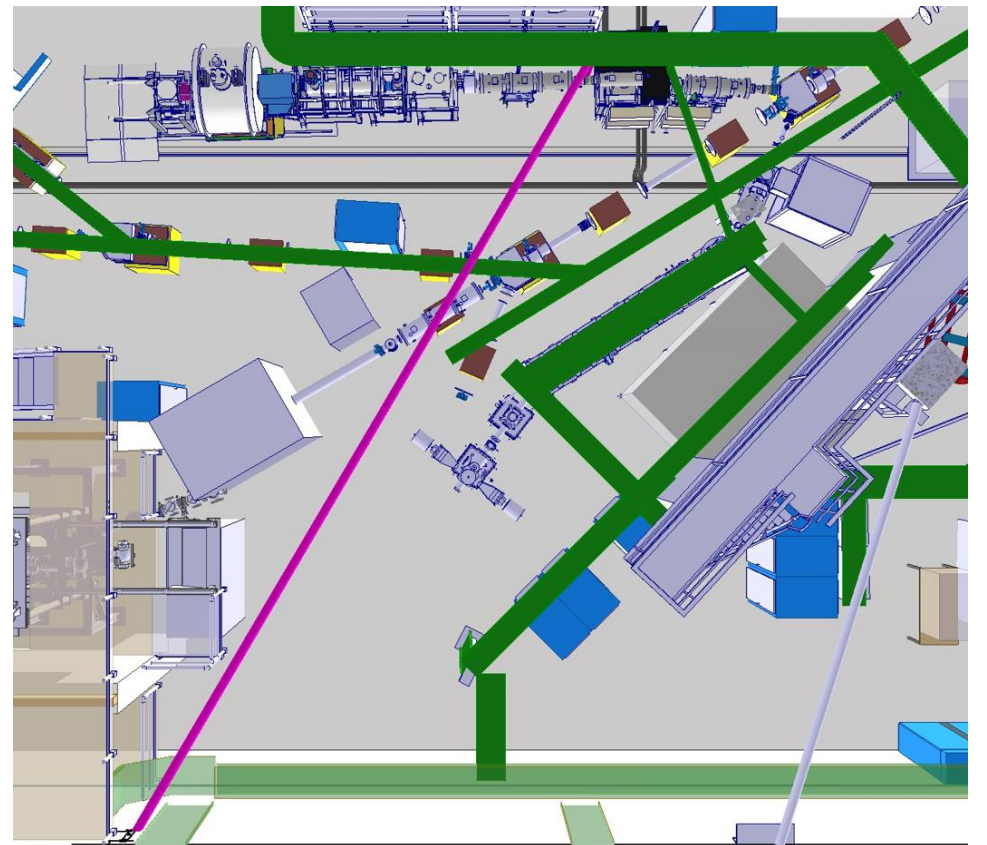
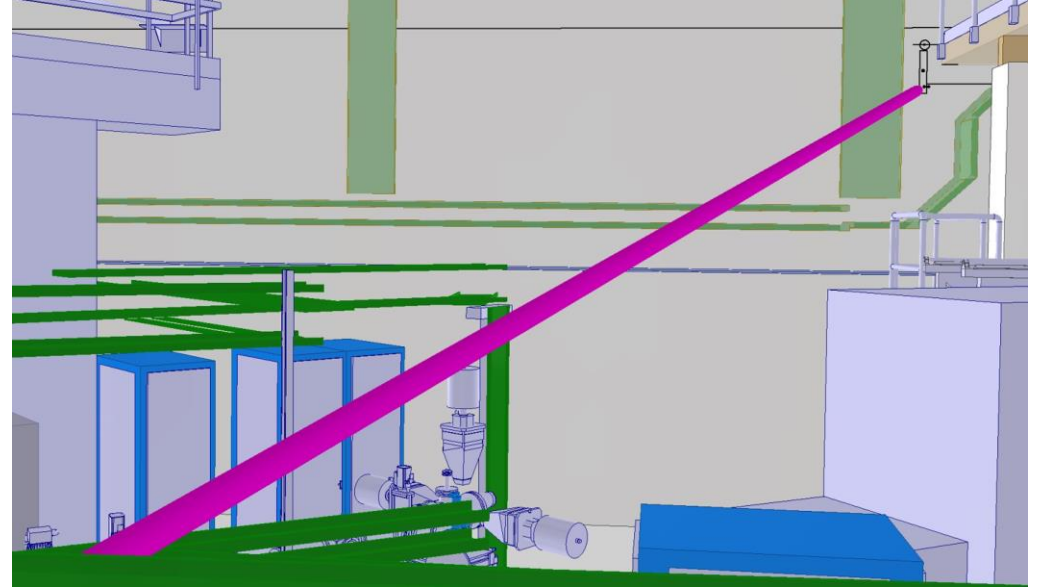
- **Impact:**

- 508-R-15 available as independent space for VITO laser system + free path to VITO
- Enough space left for another compact laser system in the room

PROPOSAL details

- Room 508 R-015 to be converted into Designated Laser Area (DLA):
 - 29 m² excluding double door (vs 22 m² in PL lab) and about 40 m² for CRIS/COLLAPS each
 - 2 air conditioning units already installed
 - Space let for another laser table
 - Free path towards VITO feasible
- Elements and cost of DLA creation:
 - Interlock system and double door - VITO (15 kCHF)
 - Laser table with VITO lasers – VITO (200 kCHF)
 - Wall opening and tube installation – request as for other experiments: hole drilling (<3kCHF) – technical infrastructure if possible, tube material and pose (1-3 kCHF) – VITO





IMPACT on other items

- In b508:
 - Room previously occupied by MIRACLS PoP that moves out
 - Detector activities hosted in PL lab (dry cabinet, working space, Ge detectors); more space available in b275
 - Space left for another laser table and separation, allowing to set up both systems independently
- Inside ISOLDE:
 - Crane access as before -> tube going downwards to VITO

IMPACT on schedule and performance

- **Schedule:** request under discussion since September 2022; proposed schedule:
 - March: drilling of the opening in the wall
 - March-April: installation of aluminium tube inside ISOLDE
 - April-May: installation of laser interlock system in the room
 - May-June: move of VITO lasers into 508 R 015
 - June-August: setup of the full laser system
- **Performance:**
 - Allowing to realise VITO scientific programme (otherwise, only 1 out of 3 runs requested in 2023 possible)
 - Lower constraints on ISOLDE schedule: independent setup of VITO lasers vs COLLAPS and MIRACLS runs
 - VITO not disturbing laser setup for COLLAPS and MIRACLS

PL lab

