# Experimental Set-ups: new and old

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# Procedure for new experimental set-ups

- At least 2-3 years before installation
  - start informal discussions with ISOLDE responsible persons

  (ISOLDE Spokesperson, Physics Coordinator and Technical Coordinators)

- At least 1-2 years prior to installation
  - Submit an LoI, describing the aimed physics program and a preliminary design and footprint of the set-up, requested services, …. to the INTC
  - Present project to the ISCC

- If endorsement of Physics Program by INTC and CERN Research Board and ISCC
  - Start detailed planning for integration of the new experimental set-up in the hall with ISOLDE physics and technical coordinators.

- When ready
  - Start installation in the ISOLDE hall
  - Submit a proposal to the INTC to request beam, based on a specific physics case.

# New experimental set-ups

## 1. approved

### MIRACLS (S. Ettenauer – ERC grant, CERN)

- June 2017: presentation to ISCC
- June 2018: detailed memorandum submitted to INTC
  - ✓ Endorsed by INTC and Research Board in June 2018
- 2019: start discussions on a possible location for the set-up:
  - ✓ Initially: LA2 ?
  - ✓ Future: MIRACLS is the ideal 'beam preparation' for PUMA, but needs to be moved to larger location allowing to connect PUMA (and possibly other devices that need beams).
  - ✓ Collaboration MIRACLS – PUMA started
- End 2020/early 2021: start installation in the hall

Reminder: recommendation by INTC, June 2018:

- ✓ **stable beam tests can be carried out in the second half of 2020** when ISOLDE should be capable of delivering stables beams again. It **strongly supports** the request that the relevant services be available to allow the successful undertaking of these tests.

# New experimental set-ups

## 2. nearly approved

### PUMA (A. Obertelli – ERC grant, TU Darmstadt)

- January 2018: LoI submitted to INTC and SPSC
  - ✓ both received it with interest
- June 2018: Detailed memorandum, including physics case, to INTC
  - ✓ INTC strongly supports the physics program
- October 2018: more detailed LoI submitted to SPSC
  - ✓ SPSC looks forward to receiving, when ready, a proposal with more details, that demonstrates the feasibility of the project by addressing solutions for the mentioned technical challenges.
  - ✓ Discussions start with AD Technical coordinator for integration
- October 2019: detailed proposal + technical design report to SPSC (> 150 pages!)
  - ✓ to be defended January 2020
- November 2019: presentation to the ISCC

- January 2020: If SPSC endorses, then endorsement of the project by Research Board
  - ✓ Start planning for place at ISOLDE hall – installation foreseen 2022-2023

# New experimental set-ups

## 3. in the pipeline

- **MultiPAC magnet** (Doru Lupascu – BMBF funded, Univ. Duisburg-Essen)
  - Nov. 2019: presentation to ISCC
  - Next step: when ready, present an LoI regarding the physics program and needed space and ISOLDE services to the INTC
- **ASPIC upgrade** (Hans Hofsass – BMBF funded, Univ. Gottingen)
  - The old APIC installation has been dismounted and sent to Gottingen, where it will be refurbished (PD hired who started working on it).
- **30 kV MR-TOF** for beam characterization (ISOLDE, EN-EP project)
  - Ongoing development, synergy with MIRACLS (will be serving as proof-of-concept)
- **GANDALF** (Dag Hanstrop, existing – movable): needs negative ions !
  - Ongoing discussions with CRIS, to couple to their Charge Exchange Cell

# Discussion on NICOLE

Available MANPOWER to get Fridge operational, maintain and run experiments

| Laboratory/country | Persons involved | Fridge Expertise | Available at ISOLDE |
|---|---|---|---|
| Univ. Novi Sad, **Serbia** | **Jovana Nicolov (SP)**<br>Andrej Vranicar (PhD)<br>Milos Travar (PhD) | <br>NICOLE learning<br>NICOLE learning | Rare<br>Few weeks/year<br>Few weeks/year |
| University of Niigata, **Japan** | **Takashi Otshubo** | NICOLE expert | Few weeks/year |
| University Tennessee, **USA** | **Robert Grzywacz**<br>**Miguel Madurga** | | |
| ILL - France | **Ulli Koster**<br>**Stephanie Roccia** (on leave from IPNO) | POLAREX and NICOLE | Only while at ILL and only for experiments |
| IPNO-France | **Carol Gaulard** | POLAREX expert | Only for experiments<br>Only for experiments |

**For comparison: man-months at CERN**

**ISOLTRAP**

| | |
|---|---|
| 2017 | 68 mm (+/-5 persons) |
| 2018 | 47 (+/-4 persons) |
| 2019 | 39 (+/-3 persons) |

**WISArD**

| | |
|---|---|
| 2017 | 17 mm (+/-1 persons) |
| 2018 | 27 (+/- 2.5 persons) |
| 2019 | 24 (+/- 2 persons) |

COLLAPS, CRIS: more than 4/year each

betadropNMR and MIRACLS: more than 5/year each

# Discussion on NICOLE

- Some observations:
  - ✓ Spokesperson is from a Non-Member country (Serbia)
  - ✓ **Only Serbia is willing to train young experts and invest in the Fridge.**
  - ✓ Japan: unclear. No reply from Taka on my questions regarding his contribution.
  - ✓ Tennessee and ILL replied: they will join, once THE SET-UP IS READY
  - ✓ Orsay reply: Carole is ready to come for experiments if Fridge is operational
    - ✓ POLAREX is fully operational and will be connected to ALTO next year.

- **Physics motivation from Novi Sad team to invest in NICOLE fridge ?**
- Physics motivation from Japan ?

- Physics motivation of Ulli: measure mixing ratio's of isotopes interesting for medical applications (info needed for targeted Auger-electron therapy)

- Physics motivation of Tennessee: neutron-asymmetry measurements proof-of-principle (**then they will buy a dedicated mK system, cryofree** !)

- Financial situation: nobody wants to invest, only Novi Sad and Japan plan to ask funding (but have nothing available)
  - ➢ So no progress to expect in next years (similar situation as past 8 years)

# Discussion on NICOLE

- SHOULD NICOLE remain at ISOLDE ?
  - Has the collaboration sufficient manpower and funding available to get the fridge operational?
  - Is the collaboration sufficiently large to operate such complicated experiment and to maintain an intense enough experimental program (thus with permanent manpower on-site)?
  - Can a 'proof-of-principle' experiment on neutron-asymmetry be done elsewhere ? (Japan, ALTO, …) ?
    - ✓ Need a polarized beam (e.g. POLAREX or LINO at ALTO or maybe at a fridge in Japan ?)
    - ✓ Need an isotope with strong beta-delayed neutron branch (n-rich isotopes are available at ALTO)
- CONCLUSION