Overview of my 4 years at ISOLDE

Gerda Neyens

November 5, 2021

content

- Staff
- Research fellows
- Applied fellows
- PhD students
- Associates
- Collaboration membership
- EPIC project
- ISOLDE outreach
- ISOLDE Visits
- Financial situation
- Summary

ISOLDE Staff 2017-2021

- Staff members on CERN LD contracts (currently max. 8 years)
  - Karl Johnston, physics coordinator (Aug 2015 – Sept 2022)
  - Magdalena Kowalska (Oct 2015 – Sept 2018) ERC beta-drop NMR
  - Stephan Malbrunot-Ettenauer (Feb 2017 - Jan 2022) ERC MIRACLS

- Permanent CERN staff:
  - Magdalena Kowalska (Jan 2020 -)

- ISOLDE User Support
  - Jennifer Weterings (2002 -) 100% user at University of Oslo
    - ✓ Funded via the ISOLDE Collaboration Team Account

New Team Account rules installed 01/2020:
→ Subsistence payments of staff on-site via Team Accounts maximum for a period of 8 years
→ OK till December 2027

CERN Research Fellows 2017-2021

From Maria's period:

- Vladimir Manea (Jan 2016 – April 2018) ISOLTRAP
- Liam Gaffney (Oct 2016 – Sep 2019 - COFUND) Miniball
- Hanne Heylen (Oct 2017 – sept 2020 – COFUND) COLLAPS-VITO

Hired since Nov 2017:

- Ronald Garcia Ruiz (Jan 2018 – Dec 2019) CRIS
- Maxime Mougeot (Sept 2019 – August 2021) ISOLTRAP
- Razvan Lica (June 2020 – May 2022) IDS
- Liss Vasquez Rodriquez (Oct. 2020 – Sept. 2022) COLLAPS
- Erich Leistenschneider (April 2021 – March 2023) PoP MR-TOF/MIRACLS
- Agi Koszorus (October 2021 – September 2023) CRIS

Learning curve

On average 3 hires over 2 years (2/year during last years)
Need EXCELLENT candidates (CV, motivation letter, project)

CERN Applied Fellows 2017-2021

From Maria's period:

Frank Wienholtz (Jan2016 – Dec 2018)	MR-TOF-MS for ISOLDE	ERC/ENSAR2
Andree Welker (Aug 2017 – July 2018)	HIFI spectrometer / WIZARD	EP-IS
Lina Pallada (Apr 2017 – May 2019)	betadrop-NMR	ERC

Hired since Nov 2017:

Joonas Konki (March 2018 – Feb 2020)	HIE-ISOLDE experiments	ENSAR2
Simon Sels (March 2018 – Feb 2020)	MIRACLS	ERC
Dinko Atanasov (April 2019 – June 2021)	WISArD	EP-IS
Markus Vilen (Oct 2019 – Sept 2022)	MIRACLS / ISOLDE MR-TOF	ERC/ENSAR2/ISCC
Bruno Olaizola (Sept. 2020 – August 2022)	HIE-ISOLDE ISS	EP-IS
Jared Croese (Aug. 2021 – June 2023)	VITO	ENSAR/EP-IS
Frank Brown (Sept. 2021 – August 2023)	HIE-ISOLDE Miniball	EP-IS

ISOLDE quota from EP-IS: 1 person every 2 years
Recent success: propose cost sharing
➔ suggest 1 year other funding (e.g. ENSAR2, ISCC, …) – 1 year EP funding)

CERN Doctoral Students 2017-2021

From Maria's period:

Razvan Lica (Sep2014 – August 2017)	IDS	CERN EP-IS
Andree Welker (Feb 2015-Jan2018)	ISOLTRAP	Gentner (Uni. …)
Jonas Karthein (Nov 2017- Oct 2020)	ISOLTRAP	Gentner (Uni. Heidelberg)

Hired during my time:

- **Varvara Lagiki** (Sept 2017 – Feb. 2021) MIRACLS ERC (Greifswald)
- **Simon Lechner** (Sept 2017 – Feb. 2021) MIRACLS Austrian Prog. (TU Vienna)
- **Jared Croese** (Feb 2018 – July 2021) betaDROPNMR CERN EP-IS +ERC (Geneva)
- **Peter Plattner** (August 2018 – Dec 2021) MIRACLS Austian Prog. (Innsbruck)
- **Katarzyna Dziubinska-Kuhn** (Sept 2018 – Feb. 2022) betaDROPNMR SWISS Fund/KT-Med (Univ. Geneva)
- **Karolina Kulesz** (Oct 2018 – March 2022) betaDROPNMR ERC (Univ. Geneva)
- **Lukas Nies** (Nov 2019 – Oct 2022) ISOLTRAP Gentner (Univ. Greifswald)
- **Franziska Maier** (Feb. 2020 – Jan 2023) MIRACLS Gentner (Univ. Greifswald)
- **Michail Atanasakis** (Sept. 2020 – Aug. 2023) CRIS EP-IS
- **Marcus Jankowski** (Jan. 2021 – Dec. 2023) VITO Gentner (TU Darmstadt)
- **Tim Lellinger** (March 2021 – Febr. 2024) COLLAPS Gentner (TU Darmstadt)

→ Use external funding programs !
→ Need a German / Austrian / Swiss (co-)promotor

Associates 2017-2021

From Maria's period (scientific associates):

- Angela Bracco (– July 2017)
- Bertram Blank (– August 2017)
- Andrei Andreyev (July 2017– June 2018)
- Joakim Cederkall (September 2017 – August 2018)

Hired since Nov. 2017:

➔ Increase success rate by not asking full year, but e.g. 6 months and then extend with 3-6 months

- Scientific Associates
  - Deyan Yordanov, 11 months (February – Dec 2019)
  - Giacomo de Angelis, 6 months (July – Dec 2020)
  - Ismael Martel, 6 months (Oct. 2020 – March 2021)
  - Robert Berger, 5 months (May 2021 – Sept 2021)
  - Sorin Pascu, 7 months (Feb. 2021 – Aug 2021)
  - Alexandre Obertelli, 1 year (Sept. 2021 – Aug 2022)
  - Janne Pakarinen, 8 months (Dec. 2021 – July 2022)

➔ Increase success rate by asking at most 3 months (then extend if needed)

- Corresponding Associates
  - Luis Fraile, 3 months (May – August 2018)
  - Maria Borge, 3 months (August – October 2018)
  - Mikael Reponen, 6 months (March – August 2020)
  - Mikolaj Baranowski 5 months (July – Nov. 2021)

ISOLDE Users

- **In-house group: 43 scientists**
  - 25 paid by CERN (staff, fellows, PhD, associates)
  - 18 externally paid users (PhD and post-docs 100% at CERN)

- **Visiting Users at ISOLDE**
  - October 2017: 1238 users
  - October 2018: 1315 users
  - **October 2020: 841 users – all non-active users removed**
  - On November 2, 2021: **937** users (increasing thanks to restart of ISOLDE)

Collaboration Memberships

- 16 member countries in 2017 (including CERN)
- 17 members in 2021
  - Bulgaria joined in 2021
- NEW: Institute memberships
  - Czech TU Prague since 2019
- Payments without signed agreement
  - Portugal
- In preparation:
  - Czech Republic is preparing to become a full member
  - Institute for Research in Fundamental Sciences, Tehran, prepares for institute member

EPIC project

thinking about the long-term future of ISOLDE

- May 2018: request from CERN directorate to think about long-term future and major projects for ISOLDE, in relation to the upcoming strategy update for the European PP community

- July 2018: call for 'big projects' in the UK
  - Project prepared by K. Flanagan, G. Neyens, R. Catherall
  - EPIC Project submitted (Exploiting the Potential of ISOLDE at CERN)

- December 2018: submit an extended version of the EPIC project as the ISOLDE Collaborations input to the ESPP (European Strategy for Particle Physics update), authors RC, GN, B Blank (ISCC chair), K Rissager (INTC chair)

- May 2019: ESPP Granada meeting
  - ISOLDE/EPIC mentioned in several presentations
  - Outcome: CERN should foster and intensify collaborations with the nuclear physics and astro-particle physics communities (consequence: CERN became associate member of NuPECC in 2021)

- 1st EPIC Workshop, December 2019 - present ideas for ISOLDE upgrades / discuss priorities

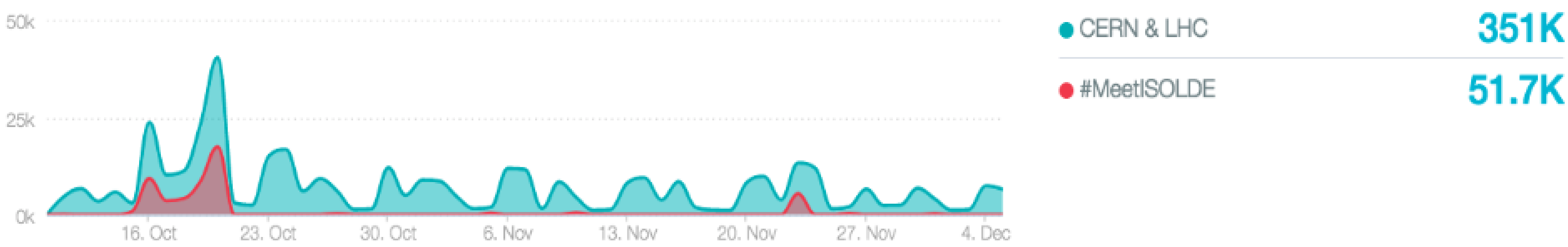
- 2nd EPIC Workshop, November 2020, on-line – focus on synergies between ISOLDE and other CERN facilities/experiments, space for new experimental set-ups using ISOLDE's low-energy RIB's, upgrade plans for the near future (~5-years) and consolidate ideas for the long-term future)

- Proceedings in preparation

Outreach activities

- Typically 6 to 10 outreach publications in CERN-related media per year
- Special thanks to Karl for writing several articles in EP Newsletter
- Thanks also to Magda and several users and their teams (ISOLTRAP, Miniball, CRIS, SSP, …) for presenting their highlight results to the CERN community
- Special Events:
  - 50 years of ISOLDE – October 2017 (initiated by Maria, YouTube life, 5 video's on Facebook and Twitter, …)
  - CERN Open Days – September 2020

50 years of ISOLDE events
Increase ISOLDE mentions on social media



Between 11 October and 5 December, #MeetISOLDE was mentioned **51.700 times** (CERN&LHC 351.000 times)

A peak of mentions was observed on 20 October (17.461 mentions), probably due to the Instagram grid and the fact that we republished the Facebook live on CERN's Facebook page.

Outreach 2018 - 8

ISOLDE Workshop 2018 in CERN Courier, Jan 2019

153 participants, 40 talks, 29 posters
4 prizes (sponsored by CAEN)

FIELD NOTES

ISOLDE WORKSHOP

Users highlight successful campaigns

On 5–7 December 2018, the annual ISOLDE Workshop and Users meeting took place at CERN, attracting 153 participants. The programme consisted of 41 presentations, of which 22 were invited talks and 19 were oral contributions selected from 74 submitted abstracts.

ISOLDE, CERN's long-running nuclear research facility, directs a high-intensity proton beam from the Proton Synchrotron Booster (PSB) at a target station to produce a range of isotopes. Different devices are used to extract, ionise and separate the isotopes according to their mass, forming low-energy beams that are delivered to various experiments. These radioactive ion beams (RIBs) can also be re-accelerated using the REX/HIE-ISOLDE linear accelerators (linacs). An energy upgrade of the HIE-ISOLDE superconducting linac was completed this year, enabling RIBs with an energy up to about 10 MeV per nucleon.

A focus of the 2018 ISOLDE workshop

beam lines. A total of 17 different RIBs were accelerated during July–November 2018. Beams of isotopes with an atomic mass from 7 to 228, with the radium-228 beam being the heaviest ever accelerated beam at ISOLDE, were delivered. The HIE-ISOLDE campaign began with seven experiments at the first beam line, with the MINIBALL detector array and its ancillary detectors. In October two experiments used the new ISOLDE solenoid spectrometer at the second beam line

Prize winners *The workshop organiser Gerda Neyens (second from right) with Victoria Araujo-Escalona and Natalia Sokolowska (two most left), who won for the best poster, and Tiago De Lemos*

had been irradiated earlier. The first HIE-ISOLDE physics paper, accepted for publication in *Physical Review Letters*, was also highlighted. It provides the first direct proof that the very neutron-rich tin-132 nucleus, considered to be doubly magic, does indeed merit this special status.

Other sessions were dedicated to the rich low-energy experimental physics programme at ISOLDE. Overview talks were presented on recent achievements in high-precision mass studies, with indium-100 as a highlight; on collinear laser spectroscopy studies, with a long series of antimony isotopes and isomers; on decay-spectroscopy experiments; and on the solid-state physics programmes. Participants also heard about recent studies with antiprotons at the Antiproton Decelerator at CERN and about the extremely exotic isotopes produced at the Radioactive Isotope Beam Factory (RIBF) facility at RIKEN in Japan. The study of exotic isotopes using the VAMOS spec-

Outreach 2019

thanks to Karl and several active users

- CERN Accelerating News 28, March-April 2019,
  ISOLDE's new solenoid spectrometer by Panos Charitos (CERN)

- EP Newsletter, March 2019
  Resolving a long-standing question at ISOLDE by Karl Johnston (CERN)
  - based on Nature Physics 14, 1163 (2018).
- EP Newsletter, June 2019
  HIE-ISOLDE: a unique window into the nucleus by Karl Johnston (CERN)
  - based on Nature Communications **10** (2019) 224,226Rn Coulex
  - based on Phys. Rev. Lett. **121** (2019) 132Sn Coulex

- **CERN Courier, News Digest, July 2019**
  EDM search goes pear-shaped – by Matthew Chalmers (CERN)
  - based on Nature Communications, Rn Coulex

- CERN Open Days – September 14-15, 2019
  - ➢ More than 80.000 visitors (about 2400 visited ISOLDE)

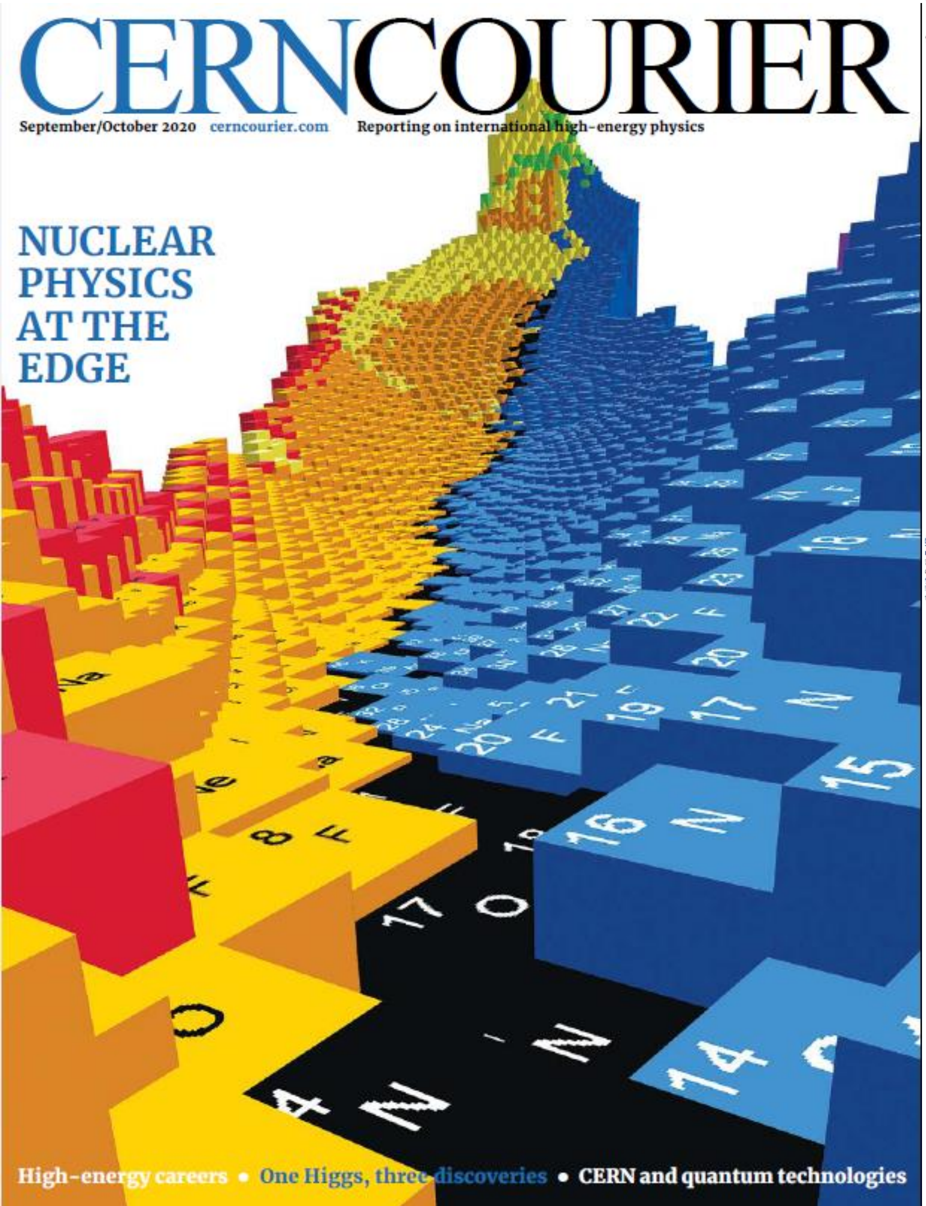
- CERN Accelerating News, October 2019
  ISOLDE's new Offline 2 source nears completion by Achintya Rao (CERN)

- EP Newsletter, December 2019
  Finding the best candidates for atomic EDM searches
  by Peter Butler & Liam Gaffney (University of Liverpool), Joonas Konki (CERN)

- **CERN Courier, December 2019**
  Obituary Ernst Otten (by J. Kluge)

ISOLDE @ CERN

Cern Courier Sept/October 2020 (D. Lunney and G. Neyens)



Outreach 2020

thanks to Karl and several active users

- EP Newsletter, March 2020
  ISOLDE dives deeper in the mystery of the odd-even staggering effect
  by Panos Charitos (based on Nature Physics Cu paper)
  PUMA: Exploring exotic nuclear phenomena with antimatter
  by Alexandre Obertelli and François Butin (CERN, PUMA project manager)

- CERN Accelerating Science, May 2020
  ISOLDE steps into unexplored region of the nuclear chart by Liam Gaffney

- EP Newsletter, June 2020
  Secrets of beta decay unraveled at ISOLDE
  by Zsolt Podolyák (PRL 125, 2020)
  Exotic radioactive molecules could reveal physics beyond the Standard Model
  by Gerda Neyens (based on Nature 451, 2020)

- **CERN Courier, May/June 2020**
  - Obituary Robert Klapish (by D. Lunney)

- **CERN Courier, Sept/Oct 2020**
  Exploring Nuclei at the Limits (by D. Lunney and G. Neyens)

Outreach 2020 - continued

thanks to Karl and several active users

- **ISOLDE on Twitter, September 2020**

  ISOLDE facility at CERN @ISOLDEatCERN

EP Newsletter of the EP department

- EP Newsletter, Sept 2020

  Pinpointing the structure of the SnV centre in diamond using emission channeling at ISOLDE

  (based on a PRL)

  by Karl Johnston

CERNCOURIER

- **CERN Courier, November 2020**

  Nuclear win for ISOLDE physicists (Lise Meitner Prize) by Craig Edwards, editorial assistant

- EP Newsletter, December 2020

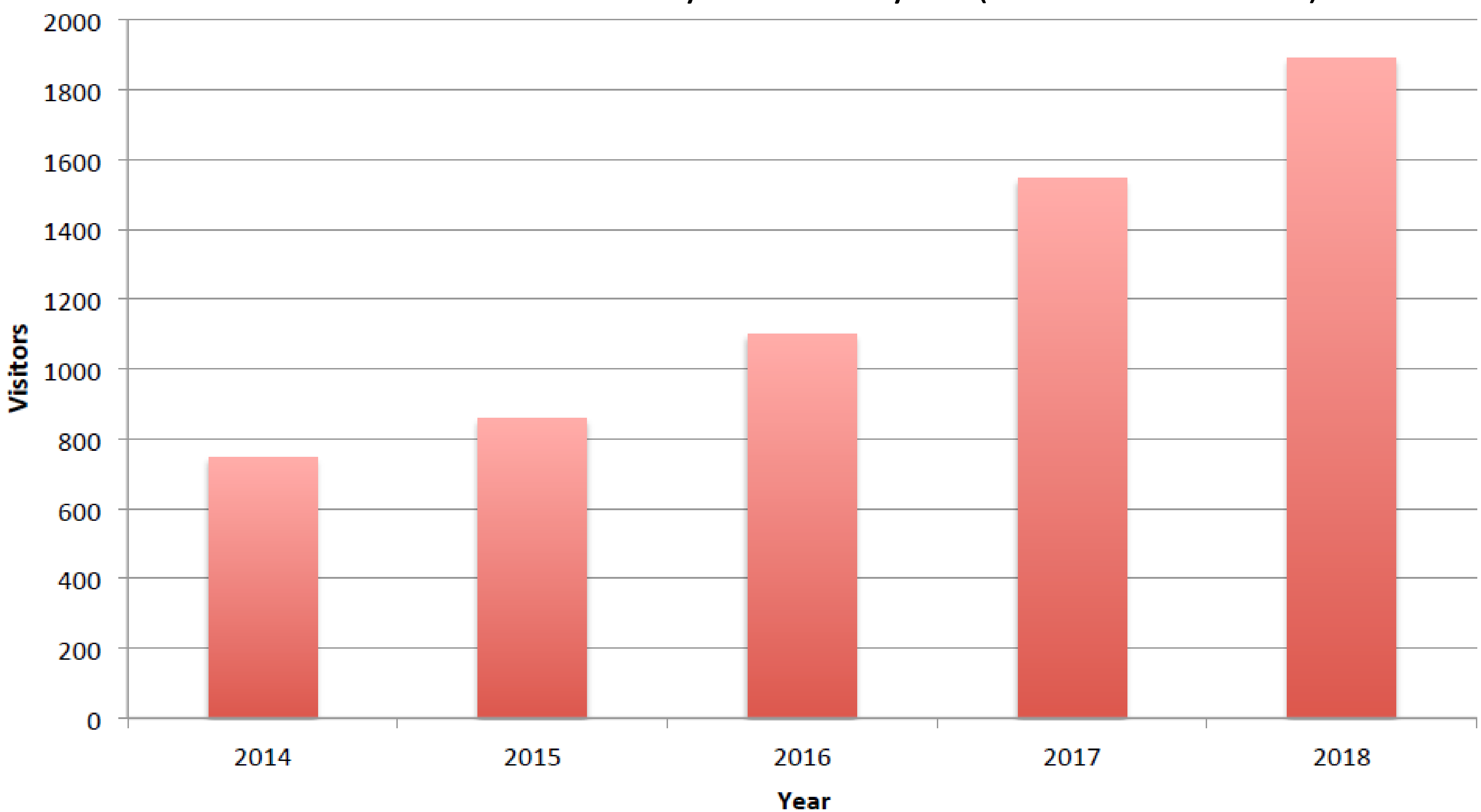
  PUMA: antiprotons to probe the surface of radioactive nuclei

  by A. Obertelli and F. Butin on behalf of the PUMA collaboration

ISOLDE

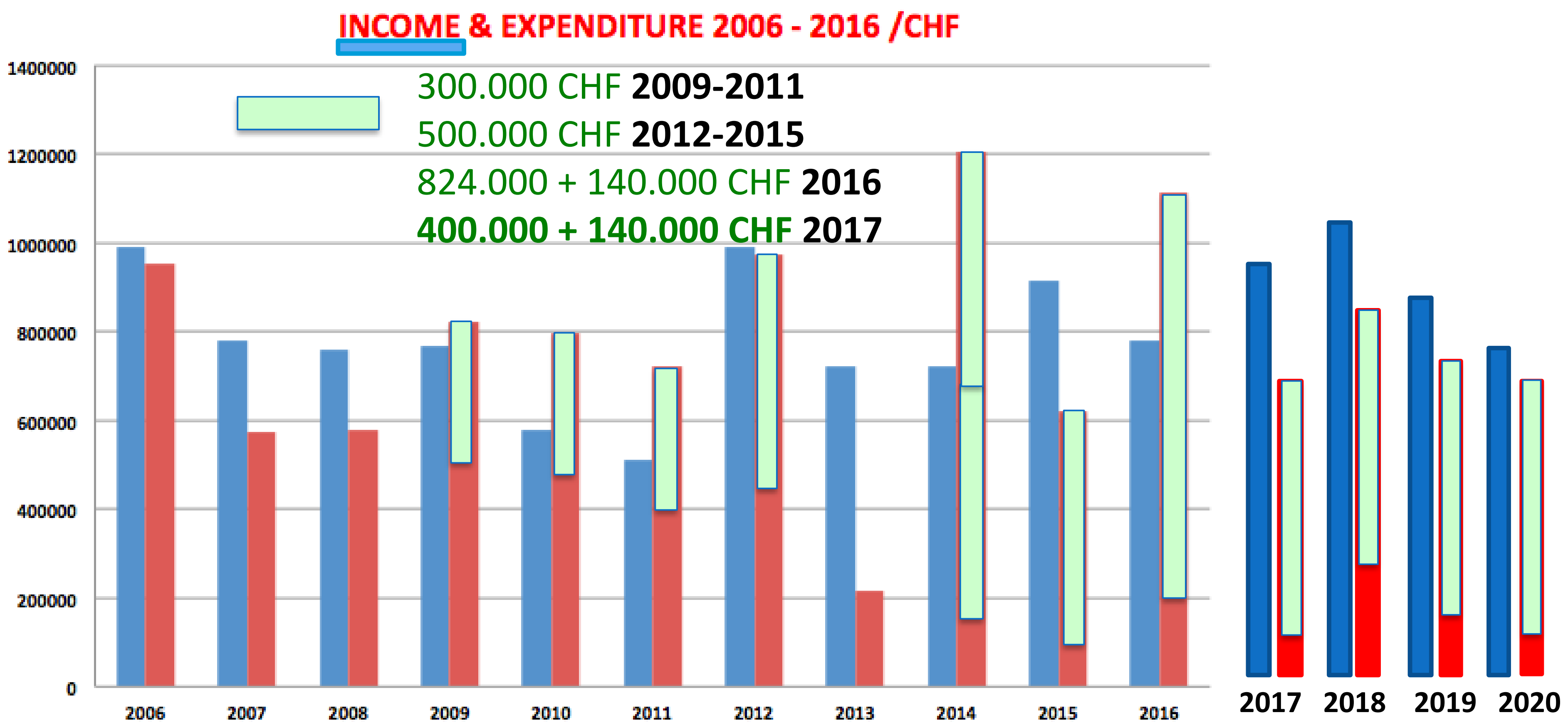
ISOLDE Visits 2018

- ISOLDE Visits: increase by almost factor 3 in 5 years !
- Thanks to enthusiastic help of many local PhD, Post-docs, Fellows, …
- Thanks to coordination by Hanne Heylen (Fellow since 2017)



Financial situation

Bleu: income on average 850 kCHF / year
Red: expenditure/year
Green: re-payments to CERN for ISOLDE investments (HIE-ISOLDE)



HIE-ISOLDE repayment to CERN

The total cost of HIE-ISOLDE was 39.4 MCHF, pre-financed by CERN

The ISOLDE Collaboration contribution to HIE-ISOLDE is 7.1 MCHF, part of which needs to be payed back as loans

- **Phase 1: 140 kCHF /year 2016 – 2020 (5 years) Loan of 700 kCHF**
- **Phase 2: 400 kCHF /year 2017 – 2023 Memo sent to E. Elsen 2.791 kCHF**

Funding Source	2007-2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
FWO I (BE)	4’460										4’460
ISOLDE Coll.	2’477	500									2’977
MPI (DE)	115										115
Aarhus (DK)	77										77
CERN loan (KM2180)			140	140	140	140	140				700
Phase 1 - TOTAL	**7’129**	**500**	**140**	**140**	**140**	**140**	**140**				**8’329**
FWO II (BE)	494	104									598
ISOLDE Coll.			433								433
CERN pre-payment			400	400	400	400	400	400	400	391	3191
Phase 2 - TOTAL	**494**	**104**	**833**	**400**	**400**	**400**	**400**	**400**	**400**	**391**	**4222**
Total paid by ISOLDE Collaboration and partners	***7’623***	***604***	***973***	***540***	***540***	***540***	***540***	***400***	***400***	***391***	***12’551***

Summary

Positive points:

- Increase of the local team of scientists (on all levels)
- Excellent collaboration with the technical teams (participation in the weekly group meetings, seminars, joined projects, ..)
- Very good visibility at CERN – good contacts with all media
- New web page (again) thanks to Jenny (following new CERN guidelines)
- Started thinking about long-term future of ISOLDE at CERN – with support from CERN (but financially still difficult in the next years)
- A very smooth transition from Richard to Joachim/Erwin
- Excellent collaboration with Karl, who takes care of all the ‘practical’ problems (even more important during covid)

Not so good:

- The GUI has met at most once per year / not enough follow-up of decisions
- Not all suggestions from Maria have been implemented (LN2 in the hall)