

Feedback from an ASP alumna

Dr. Sanae SAMSAM

INFN-Milan





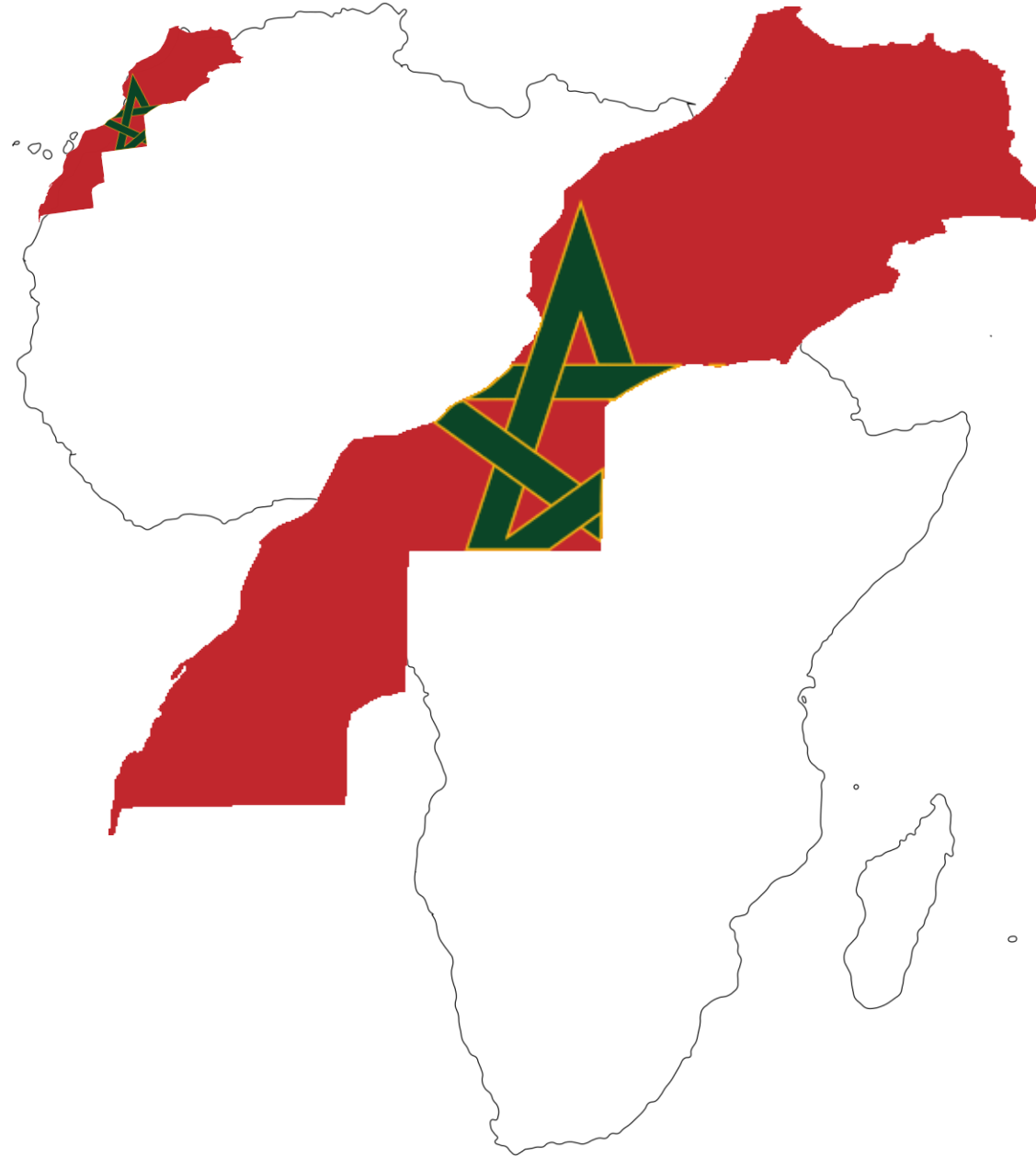


Origines

Kingdom of Morocco

المملكة المغربية

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Salé, Morocco



Rabat, Morocco



- **B.Sc : Energy and Mechanics. University of Mohammed V, Rabat, Morocco**
- **Specialized B.Sc : Medical Physics. University of Mohammed V, Rabat, Morocco**
- **M.Sc : M.Sc in Quantum Physics: Applications to information theory. University of Mohammed V, Rabat, Morocco**



- **PhD : INFN PhD school in Accelerator Physics. University of La Sapienza, Rome, Italy.**



Vittoria Petrillo
University of Milan



Luca Serafini
INFN-Milan

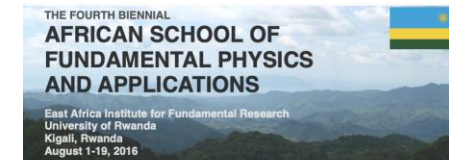


Ketevi Assamagan
BNL

ASP School Edition



ASP 2016, Kigali, Rwanda



Application: asp2016-registration@cern.ch
 Deadline: Open for application from Dec 14th, 2015 to March 31st, 2016. Bursaries and full support for selected students. Provide a CV, transcripts, letter of motivation and one recommendation letter with your Online Application.
 Contact: asp2016-ice@cern.ch
 Website: www.african-school-of-physics.org

Physics Topics:
 - Theoretical Physics
 - Particle Physics
 - Nuclear Physics
 - Medical Physics
 - Monte Carlo Generators & Simulations
 - Accelerators & Technology
 - Grid Computing



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ASP16 folks

The Mentorship Program



Dr. Luca Serafini
INFN

My Mentor and PhD supervisor

Dr. Kétévi Assamagan
BNL

<https://africanschoolofphysics.org/mentoring-and-coaching-program/>

ASP 2016 Folks



African School of Fundamental Physics and Applications



Istituto Nazionale di Fisica Nucleare



With George Zimba & Mounia Laassiri.
November 2022, Finland



ACP23. September 2023, George, South Africa



With Davis Welakuh, February 2024, New York, USA
13/07/2024



With Ann Nejri, April 2024, Marrakech, Morocco

ASP 2016 Folks

Mounia Laassiri Post Doc Brookhaven BNL, USA	George Zimba Post Doc FRIB, MSU	Jessica Li PhD in Astrophysics University of Arizona	Davis Welakuh Post Doc New York University
Enoch Ejogu PhD in Particle Physics University of Manchester	Eric Samikwa PhD in Computer Sc University of Bern	Abulgaifar Abdulrazzak Post Doc LAAS CNRS, Toulouse	Ann Njeri Research Assistant MCL, UK

Successful researchers!

J. Yvon-UNESCO for Women in Science 2024 Rising Talent Award

The 8th African School of Fundamental Physics and Applications, ASP2024

ASP2024 Outreach Program

The 8th African School of Fundamental Physics and Applications, ASP2024

ASP 2016 Folks



Mounia Laassiri
Post Doc
Brookhaven BNL, USA



George Zimba
Post Doc
FRIB, MSU



Jessica Li
PhD in Astrophysics
University of Arizona



Davis Welakuh
Post Doc
New York University

Successful researchers!



Enoch Ejopu
PhD in Particle Physics
University of Manchester



Eric Samikwa
PhD in Computer Sc
University of Bern



Abulgaffar Abdulrazzak
Post Doc
LAAS CNRS, Toulouse



Ann Njeri
Research Assistant
NCL, UK

*L'Oreal-UNESCO for
Women in Science 2024
Rising Talent Award*

ASP2024 Outreach Program

INFN
Introduction to Accelerator Science: Activities & Lecture
ASP24 Outreach
15-19 April, 2024
Dr. Sanae SAMSAM - INFN - Partie 1
Dr. Christine Darve - ESS - Partie 2
Partie 1



Introduction to accelerator science: Activities and Lecture
ASP2024 Outreach
15-19 April, 2024
Dr. Sanae SAMSAM - INFN - PART 1
Dr. Christine DARVE - ESS - PART 2
Partie 2



Know more about ASP Alumni



<https://www.aps.org/publications/african-physics-newsletter>



The Path of a Young African Woman Toward Light Sources

How the African School of Physics and mentorship opportunities have been decisive in navigating my career in the field of physics.



(Photo Credit: Sanae Samsam)

Attending the African School of Physics (ASP) [1] in 2016 was a life-changing experience for me. The opportunity to meet scientists from around the world, all with different backgrounds and experiences, was both inspiring and eye-opening. However, it was the guidance and encouragement of Dr. Luca Serafini and Dr. Kétévi Assamagan that left the deepest impression on me. Their encouragement has given me the confidence to pursue my PhD in physics, and for that, I will be forever grateful. In this article, I share my experience and the impact it has had on my career and personal growth.

Dream Come True Through the ASP Mentorship Program

During my three-week stint at the ASP in Kigali, Rwanda, I was exposed to an array of courses that were both intense and inspiring. This incredible experience was further enriched by the company of new friends from various parts of Africa. The highlight of my time at the school was undoubtedly the ASP mentorship program, which proved to be transformative for my research career. Under the guidance of my mentor Luca Serafini, I completed my first training abroad at the Italian National Institute for Nuclear Physics in Milan (INFN-Milan) after being awarded my first two scholarships. The first originated from the International Center for Theoretical Physics (ICTP) through the Training and Research in Italian Laboratories (TRIL) program [2] while the second was granted from the Italian Ministry of Foreign Affairs and International Cooperation (MAECI). Subsequently, I was able to hone my skills and receive vital assistance in my quest to secure admission for a PhD at La Sapienza University of Rome, in collaboration with INFN-Milan.

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African School of Physics Alumnus Diallo Boye Awarded the Goldhaber Fellowship

From the African School of Physics to excellence at Brookhaven National Laboratory.



(Photo Credit: Diallo Boye)

Every year, the U.S. Department of Energy (DOE) at Brookhaven National Laboratory (BNL) awards, up to two recipients, the Goldhaber Distinguished Fellowship. This prestigious distinction is awarded to exceptional early-career scientists who have completed their PhD within the last three years at the time of application, work at the frontiers of their respective fields with a proven track record, and demonstrate a strong ability for performing independent research.

The Goldhaber Fellowship entails a three-year appointment with a starting annual salary of \$100,400. The Fellowship is named after Maurice Goldhaber and his wife, Gertrude Scharff-Goldhaber, who have not only contributed in shaping BNL but also significantly impacted the field of nuclear physics as scientists. The program is designed to perpetuate a culture of scientific excellence at BNL and pave the way for the next generation of scientists at BNL. It predisposes the awardees to staff positions at BNL, upon successful completion of their appointment.

AUTHOR & CONTRIBUTING EDITOR
Stephane Kenmoe

Advancing Nuclear Physics: A Journey from Zambia to Michigan State University

Dr. George Zimba is a nuclear physicist from Zambia and an alumnus of ASP2016, the 4th edition of the African School of Physics (ASP) [1]. He is a Research Associate at the Facility for Rare Isotope Beams (FRIB) at Michigan State University (MSU) in the US. MSU operates FRIB as a user facility for the US Department of Energy's Office of Science (DOE-SC), supporting the mission of the DOE-SC Office of Nuclear Physics. Zimba holds a PhD in physics from the University of Jyväskylä in Finland. Additionally, he earned degrees from the University of Zambia and the University of Johannesburg. Zimba's research focuses on the nuclear structure of nuclei with an equal number of protons and neutrons. Furthermore, his research includes nuclei with neutron numbers between 20 and 28, below an atomic mass of 46.



Figure 1: (Photo Credit: Marjut Hukkanen and Daniel Söderström)

Mounia Laassiri: How did you get started in science? Specifically, in this field?

My introduction to nuclear physics began during my final year at the University of Zambia, where I embarked on a project focused on measuring naturally occurring radioactive nuclides in building stones. This initial foray into the field sparked my curiosity and ignited a passion for nuclear physics that continues to drive my academic pursuits today.

Who inspired or influenced you to make this transition?

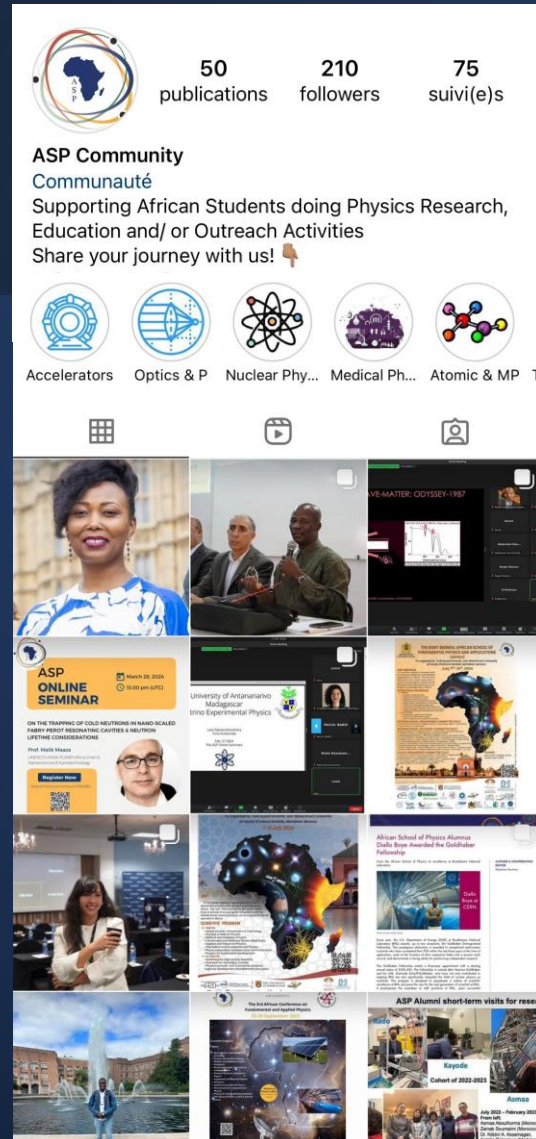
My mother has been a steadfast source of inspiration throughout my academic journey. Her unwavering support and encouragement have played a pivotal role in shaping my aspirations and determination to succeed. Furthermore,

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CONTRIBUTING EDITOR
Dr. Mounia Laassiri

APRIL 2024

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<https://www.facebook.com/asp.alumni.community>



<https://africanschoolofphysics.org/>

8 years later: BNL visit



ATF BNL Activity
Sanae SAMSAM (ASP2016 Alumna)
PostDoc at INFN-Milano

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Brookhaven National Laboratory BNL, Upton, NY, 11793

Ketevi Assamagan
Brookhaven National Laboratory BNL, Upton, NY, 11793

Luca Serafini
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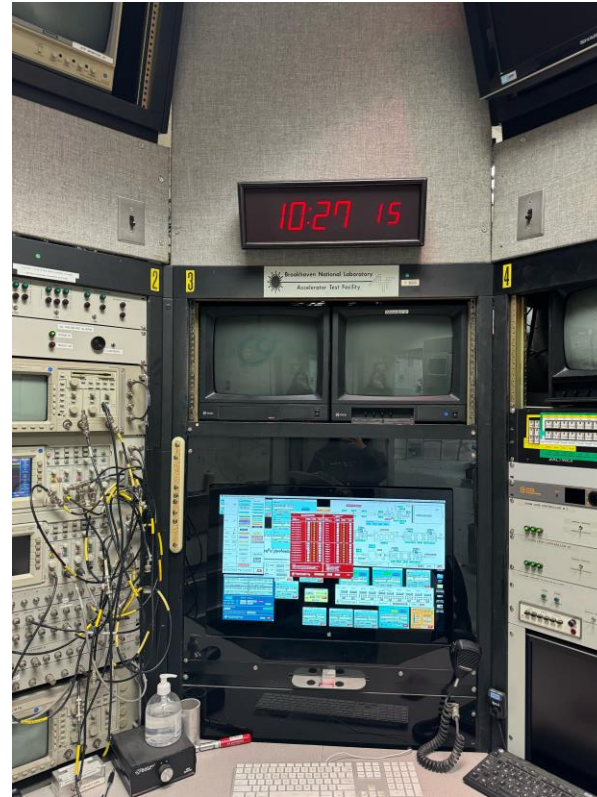


The Accelerator Test Facility (ATF) at Brookhaven National Laboratory (BNL) serves as a premier research hub for accelerator and beam physics [1]. During my two-month training at this cutting-edge facility, I engaged with advanced technologies and experimental setups that highlight the ATF's capabilities. The facility provides high-brightness electron beams, near-infrared (NIR) and long-wave infrared (LWIR) laser beams, alongside an ultrafast electron diffraction (UED) setup. These resources are crucial for pioneering studies in high-gradient acceleration techniques and the development of state-of-the-art free-electron lasers (FELs). This experience has significantly enhanced my understanding and skills in accelerator physics, equipping me with practical insights into the experimental methods and technological innovations driving this field.

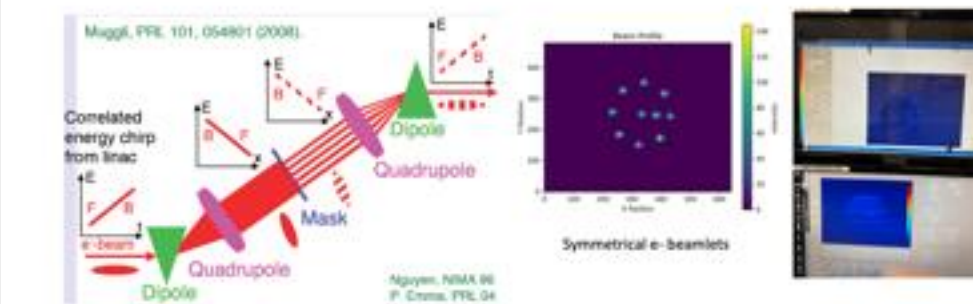


The electrons at ATF are produced by a laser photocathode RF gun and accelerated from 50 to 100 MeV in the past which arrive up to 75 MeV now. ATF lasers include a 10-mJ, 10-ps Nd:YAG laser and a 100-mJ, 10-ps CO2 laser. ATF helps provide a user facility where researchers can develop transformational capabilities to support the fields of energy and environment, medicine, industry, national security, and discovery science. The facility provides free access to

1



Beam capabilities: Mask technique



Muggli, FFE, 101, 054801 (2008).
Nguyen, NIMA 96, P. Choma, FFE, 04

The 8th African School of Fundamental Physics and Applications, ASP2024

Turn ON Procedures

GUN, LINAC & HLINE safety

- Experiment name: startup
- Check: RF levels at zero
- Radiation alarm panel enabled/OK

Operational information

- Linac water: 44.9 °C
- Gun temperature set point: 20.8 °C
- Gun Vacuum: $8.7 \cdot 10^{-11}$ Torr
- Linac Vacuum: $1.1 \cdot 10^{-9}$ Torr
- Check : Linac attenuator locked, Gun area gate source, Linac tunnel plug door secure...
- Beam limited $\leq 5W, \leq 85 MeV$
- Beam parameters logged

Turn Off Procedures

- RF and magnets set to zero
- Modulator HV supplies off
- Valves closed (LV1/HV1/ FV1)
- Beamline valves closed



Turn ON Procedures

GUN, LINAC & HLINE safety

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13/07/2024



Thanks to Mikhail Fedurin and Ketevi Assamagan

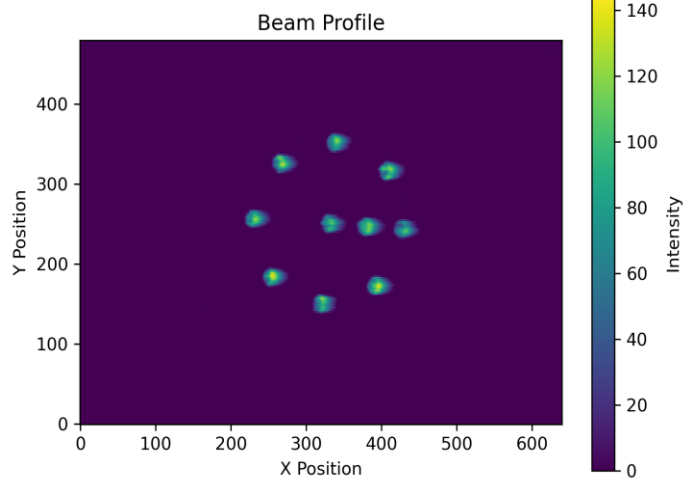
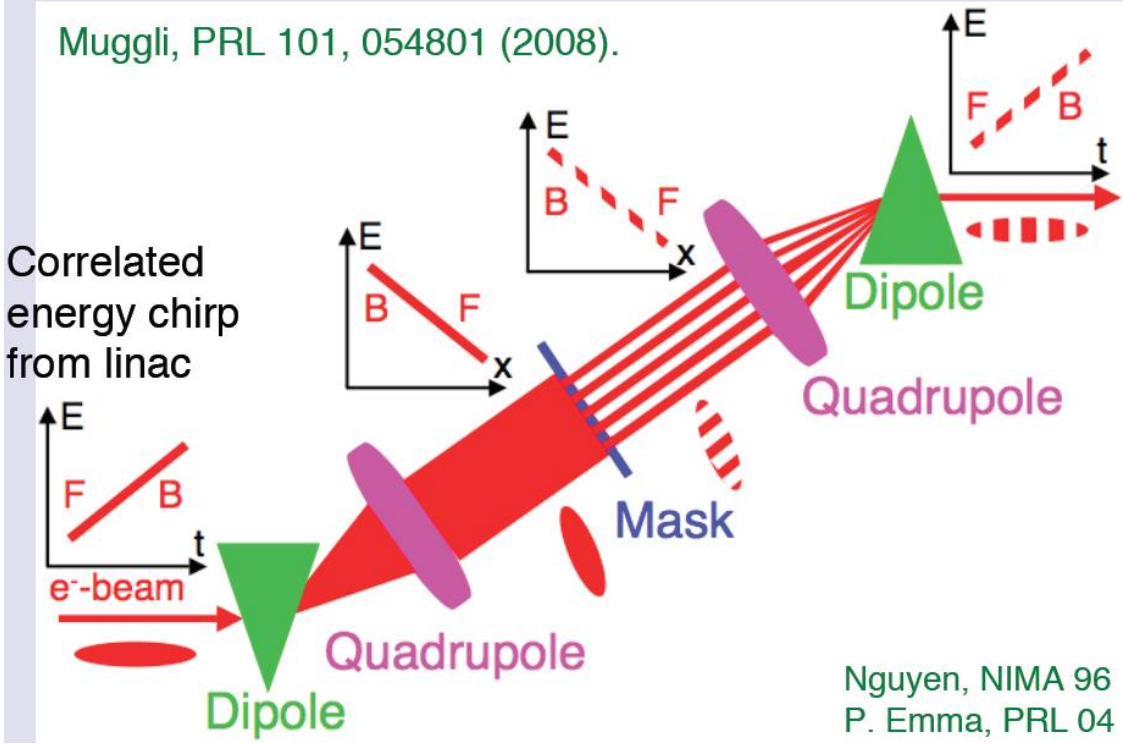
Attachment 8.1
CHECKLIST FOR OPERATION OF THE ATF LINAC IN BUILDING 820
NOTE: Any discrepancies in this checklist may be reported to ESH, or to a safety officer, and an incident report filed with IRR/ESH 104, "Safety Procedures"

- TURN ON PROCEDURE -	
GUN, LINAC & HLINE SAFETY	
Date (mm/dd/yy)	03/07/24 07:47:14
Time (military 0000-2400hrs)	10:00 15:57
Experiment name	
RF levels at zero	Handup 5mag, 4.5
Rad. alarm panel enabled/OK	<input checked="" type="checkbox"/>
OPERATIONAL INFORMATION	
Linac water temp (°C)	44.9 44.6
Gun temp set point (°C)	20.8 20.8
Gun vacuum (Torr)	8.7 8.7
Gun/Linac vacuum (Torr)	1.1 1.1
Linac attenuator locked	<input checked="" type="checkbox"/>
Gun area gate secure	<input checked="" type="checkbox"/>
Linac tunnel plug door secure	<input checked="" type="checkbox"/>
Valves open (LV1/HV1/FV1)	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Beam limited $\leq 5W, \leq 85\text{MeV}$	<input checked="" type="checkbox"/>
Beam parameters logged	<input checked="" type="checkbox"/>
Signed	
EXP. HALL SAFETY	
Time (military 0000-2400hrs)	
Rad. area access keys checked	
EH plug door secure	
Attn. hatch closed/locked	N/A
Beamline valves open	
EH searched	
Signed	
- TURN OFF PROCEDURE -	
Date (mm/dd/yy)	03/07/24
Time (military 0000-2400hrs)	15:25
RF and magnets set to zero	<input checked="" type="checkbox"/>
Modulator HV supplies off	<input checked="" type="checkbox"/>
Valves closed (LV1/HV1/ FV1)	<input checked="" type="checkbox"/>
Beamline valves closed	<input checked="" type="checkbox"/>
Keys returned	<input checked="" type="checkbox"/>
Signed	
Audit (ESH use only)	
DO NOT LEAVE ANY ENTRIES BLANK - Write "N/A" for all cells that are not applicable.	

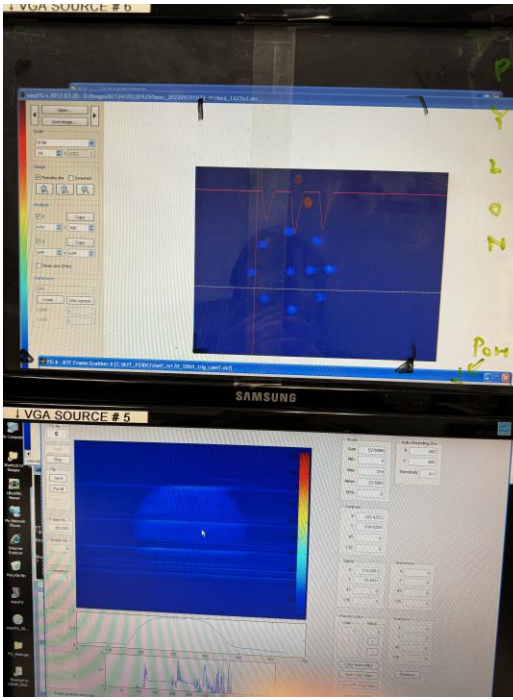
C-A-OPM 21.1.1 Page 6 of 7 Revision 04 September 14, 2021



Beam capabilities: Mask technique



Symmetrical e- beamlets



- Theoretical researches: Inverse Compton scattering (ICS), Full Inverse Compton Scattering (FICS), Symmetric Compton Scattering (SCS)...
- Optimization and simulations of X-ray Compton radiation spectra in the linear and non-linear regime.
- High energy line measurements of STAR Project in Calabria, Italy. (soon)
- Simulations of High Order Modes effects on beam dynamics in superconducting cavities for BriXSinO project (Proposal to build an Energy Recovery Linac in Milan, Italy).

My experience at STAR & ATF BNL



The First African Light Source Project Roundtable Discussion at the African Conference of Physics (ACP2023)

Led by accelerator physics experts, a collaborative roundtable unveiled the African Light Source Project (ALS), attracting a global audience.



AfLS discussion at the ACP2023 in George, South Africa.

(Photo Credit: The Authors)

The 3rd biennial African Conference on Fundamental Physics and Applications (ACP[1]), covered a broad spectrum of topics, ranging from particle and nuclear physics to renewable energies, thereby fostering collaboration and innovation. The conference exemplified the spirit of innovation and collaboration. From delving into the depths of particle physics to venturing into the cosmic mysteries of astrophysics, this unique event offered a platform for experts to discuss subjects as diverse as artificial intelligence, quantum physics, earth science, and accelerator physics. Committed to inclusivity, ACP2023 also championed the voices of young physicists and women in physics, acknowledging the importance of diversity in scientific pursuits.

Within this rich scientific tapestry, the spotlight shone on the African Light Source Project (ALS). This interactive platform provided an opportunity to gather and listen to diverse ideas and propositions, enriching the ACP experience with thoughtful insights and collaborative discussions.

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CONTRIBUTING EDITOR
Mounia Lassiri

JANUARY 2024



<https://star.unical.it/>

<https://indico.cern.ch/event/1229551/sessions/505466/#20230925>



Group Publications

- L. Serafini & al. Symmetric Compton Scattering: A way towards plasma heating and tunable mono-chromatic gamma-rays. DOI: [10.1016/j.fpp.2023.100026](https://doi.org/10.1016/j.fpp.2023.100026)
- L.Serafini & V.Petrillo. From Compton Scattering of photons on targets to Inverse Compton Scattering of electron and photon beams. <https://www.researchgate.net/publication/380397844> From Compton Scattering of photons on targets to Inverse Compton Scattering of electron and photon beams
- S. Samsam, L.Serafini & al. Progress in the energy upgrade of the Southern European Thomson back-scattering source (STAR). DOI: [10.1016/j.nima.2023.168990](https://doi.org/10.1016/j.nima.2023.168990).
- S. Samsam & al. High Order Mode analysis in Energy Recovery Linac based on an energy budget model. DOI: [10.18429/JACoW-IPAC2023-MOPA018](https://doi.org/10.18429/JACoW-IPAC2023-MOPA018)
- M.Ruijter. Increasing the Flux of a Thomson Source While Maintaining a Narrow Bandwidth by Using Large Energy Spread Primary Particles. DOI: [10.18429/JACoW-IPAC2023-TUPL177](https://doi.org/10.18429/JACoW-IPAC2023-TUPL177)
- V. Petrillo & al. Polarization of x-gamma radiation produced by a Thomson and Compton inverse scattering. DOI: [10.1103/PhysRevSTAB.18.110701](https://doi.org/10.1103/PhysRevSTAB.18.110701)
- I.Drebot & al. NON-DESTRUCTIVE DEFINITION OF EMITTANCE USING THE COMPTON BACK-SCATTERING AND AI MACHINE LEARNING. DOI: [10.18429/JACoW-IPAC2023-THPL113](https://doi.org/10.18429/JACoW-IPAC2023-THPL113)
- M. R. Conti & al. Achromatic Low Energy Merger for Energy Recovery Linacs. DOI: [10.18429/JACoW-IPAC2023-MOPA019](https://doi.org/10.18429/JACoW-IPAC2023-MOPA019)
- C. Curatolo, I. Drebot, V. Petrillo, L. Serafini, Analytical description of photon beam phase spaces in inverse compton scattering sources, Phys. Rev. Accel. Beams 20 (2017) 080701. <https://link.aps.org/doi/10.1103/PhysRevAccelBeams.20.080701>. doi:10.1103/PhysRevAccelBeams.20.080701.




SAPIENZA
UNIVERSITÀ DI ROMA

Ministero degli Affari Esteri
e della Cooperazione Internazionale

References



- ASP Mentorship Program
<https://www.africanschoolofphysics.org/mentoring-and-coaching-program/>
- MAEICI Scholarship:
https://www.esteri.it/en/opportunita/borse-di-studio/per-cittadini-stranieri/borsestudio_stranieri/
- Training and Research in Italian Laboratories (TRIL)
<https://www.ictp.it/opportunity/training-and-research-italian-laboratories-tril>
- PhD in Accelerator scholarship at LA SAPIENZA University.
https://phd.uniroma1.it/web/ACCELERATOR-PHYSICS_nD3504_EN.aspx



I believe that the future of physics in Africa is bright, and it's our collective responsibility to ensure that this light continues to shine. Let us seize this school as an opportunity not only to exchange groundbreaking ideas but also to nurture the seeds of curiosity and ambition in the hearts of our young scientists, with a special focus on encouraging **women** to pursue careers in physics.

Thank you



African School of Fundamental Physics and Applications

