I also do physics engagement within the United States (MSI and URM in particular). In this talk, I will concentrate on Africa.
Moroccan HEP Cluster
- Joined ATLAS in 1996
- Hosted ATLAS week in 2013
- Cluster of 7 institutes
- EM Calorimeter
- Software, Computing
- Phase 1, 2 upgrades
- SM, BSM, Higgs
- Dark Sectors
- ~40 people
- ANTARES/KM3NeT

Egyptian Network of HEP
- Joined CMS in 2010
- 2019, CHEP-FU member of CMS
- RPC tests, assembly, Triger; GEM
- SM, Higgs, BSM, Dark Sectors
- Super computer lab
- ~31 people

South Africa – CERN Program
- ALICE since 2001, 3 institutes:
  - dHLT, di-μ studies, upgrade
- ATLAS, affiliation to BNL 2008-2010, full member since 2010.
- Significant group, rich physics

South Africa – CERN Program
- ISOLDE
- Theory, computing

Egypt
- Egyptian Network of HEP
- Joined CMS in 2010
- 2019, CHEP-FU member of CMS
- RPC tests, assembly, Triger; GEM
- SM, Higgs, BSM, Dark Sectors
- Super computer lab
- ~31 people

Morocco: ATLAS, Theory
Egypt: CMS, Theory
South Africa: ATLAS, ALICE, ISOLDE, Theory
Madagascar: DUNE, Theory
Other countries with physicists in HEP

African countries with formal HEP programs and other countries with physicists in HEP

HEP in Africa
Building capacity—the African School of Physics (ASP)

High School Outreach

3-6 months US research visits

Online lectures

High School teachers

Student Mentorship

African School of Physics
- South Africa, 2010, 2022
- Ghana 2012
- Senegal 2014
- Rwanda 2016
- Namibia 2018
- Morocco 2020-online, 2024

Over 2k student applicants;
Selection rate: 1 in 5

- ASP is much more than a school;
- it’s a system of physics activities for education & research development

Engagement with Policy makers
523 applications in 2018
85 selected; 30 waiting list
During the COVID-19 pandemic

- 20 ASP student alumni obtained PhD in physics; about 1/3 in HEP
- There were many others before the pandemic
- ASP2020 postponed; organized online in 2021
- African students modeled 1 year of COVID-19 data of their own countries. 10 countries considered; over 50% of entire COVID-19 cases in Africa in this study; results published in the Scientific African DOI https://doi.org/10.1016/j.sciaf.2021.e00987

APS alumni learned about
- Analysis tools in C++ and Python
- Understanding their data
- Modeling, goodness of fit
- Statistical analysis
- Uncertainties (statistical, systematic)
- Estimation of basic reproduction number $R_0$
- Giving scientific talks
- Writing a paper and responding referees comments

Challenging online efforts: worked with students with full fluency only in French, English or Portuguese
During the COVID-19 pandemic

**General level of satisfaction with ASP2021**

<table>
<thead>
<tr>
<th>Satisfaction Level</th>
<th>Number of Participants</th>
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<tbody>
<tr>
<td>Very Satisfied</td>
<td>60</td>
</tr>
<tr>
<td>Satisfied</td>
<td>40</td>
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<tr>
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<tr>
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<tr>
<td>Very Dissatisfied</td>
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</tbody>
</table>

**2nd African conference on Fundamental and Applied Physics, March 7-11, 2022**

**3rd conference in 2023**
ASP Alumni impacts...

Dr. Laza Rakotondravohitra
Alumnus of ASP2010
PhD at Fermilab on MINERvA,
thanks to Prof. Young-Kee Kim.
Laza was instrumental in getting his country, Madagascar, into DUNE. Thanks to David Martinez

Dr. Benard Mulilo
Alumnus of ASP2010
PhD at RIKEN Japan on PHENIX.
Now, working to develop a heavy ion physics program in his country, Zambia

Dr. Marie Chantal Cyulinyana
Alumna of ASP2016
PhD, Renewable energies
Uni. of Johannesburg
Rwandan Ministry of Education
Rwandan Association of Women in Science & Engineering (RAWISE)
Africans in Snowmass and CSS

- We have African participants in Snowmass and CSS
- Small but worth noting
- Cameroon, Nigeria, Senegal, South Africa, Togo, Tunisia, Zambia, ..., are represented

Proposal to add vector DM interpretation and extension below 1 GeV

Prof. Azwinndini Muronga
Heavy Ion Physics Theorist
Dean of Science
Nelson Mandela University, South Africa
Snowmass Advisory Committee.
Co-convener of CEF05. Co-author of many white papers and TG report

Dr. Diallo Boye
Alumnus of ASP2012
Post-doc at BNL on ATLAS. He gave a CSS talk on “Testing DM with the Higgs boson” based on this white paper
https://doi.org/10.31526/lhep.2022.270

Contributed paper jointly by Mohammed V University Morocco, Uni. of Johannesburg South Africa and BNL, in EF10

And some of you know me; I am dual citizen Togo / US
Coming soon — the 7th edition of the African School of Physics, ASP2022

Hosted by the Prof. Azwinndini Muronga
In progress — the African Strategy for Fundamental and Applied Physics (ASFAP)

- Mandated by the African Physics Society (AfPS)
- Includes other fields in addition to HEP
- Follow the steps of our colleagues in Latin America
- Learn the process of community-driven physics roadmap exercise
- Strengthen AfPS
- Complement top-down strategies
- Slow but steady progress; interim report to be submitted to the IAC in the next few months

**ASFAP Process Time Scale**

**Stage-1: 2019**
- ASFAP Preparation & Brainstorming
- STC Co-founding & Launching

**Stage-2: 2020**
- June: Definition of the process
- Oct-Dec: Appointment of IAC
- Oct-Dec: Appointment of Observer and ethics C.
- Oct-Dec: Appointment of PWGs Conveners
- Oct-Dec: Appointment of CE Conveners
- Oct-Dec: Consultation with IAC
- Nov: Official launch

**Stage-3: 2021**
- Jul: ASFAP Community Town Hall
- Sept-present: Letters of Intent solicitation
- Oct: Pan-African Roadmap Community Discussion

**Stage-4: 2022**
- March: Planning discussion at ACP2021 Conference
- Apr-Jun: Consultation with IAC & Stakeholders
- Jun-Nov: From LOIs to White Papers topics study groups
- Sept-Nov: From White Papers to the Preliminary draft report
- Keep soliciting community input: LOIs, Workshops, Conferences, Panel, etc

**Stage-5: 2023**
- ASFAP Symposium and Community feedback
- ASFAP Final Report
- IAC endorsement Submission to AfPS Executive Committee, AAS, AU, others Stakeholders

**PHYSICS GROUPS**
- Accelerators
- Astrophysics & Cosmology
- Atomic & Molecular Physics
- Biophysics
- Computing & 4IR
- Earth Science
- Energy
- Fluid and Plasma Instrumentation & Detectors
- Light Sources
- Condensed Matter & Materials Physics
- Medical Physics
- Nuclear Physics
- Particle Physics
- Optics and Photonics
- Complex Systems

**ENGAGEMENT**
- Community Engagement
- Observers Committee
- Ethics Committee
- Physics Education
- Women in Physics Forum
- Young Physicists Forum
Why should the US care about HEP in Africa and Latin America?

- It is a legitimate question
- We submitted a Snowmass white paper to answer that question; please check it out, arXiv:2203.10060

We are interested in ASP-USPAS collaboration to train African students in accelerator physics. Also, we would like to extend the ASP short-term visits for research program to other Labs.

Acknowledgements

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We appreciate the continued support of ICTP, DOE, BNL, South African National Research Foundation, South African Institute of Physics

We need your support and partnerships; but, it is important for us, Africans, to manage and lead these activities ourselves.