Addendum to the Executive Summary of nuSTORM at CERN

Editors of the ESPPU Executive Summary:


1 CERN, Esplanade des Particules 1, 1217 Meyrin, Switzerland
2 School of Physics & Astronomy, University of Manchester, Oxford Road, Manchester, M13 9PL, UK
3 Virginia Polytechnic Institute and State University, 925 Prices Fork Road, Blacksburg, VA 24061, USA
4 STFC, Rutherford Appleton Laboratory, Harwell Campus, Didcot, OX11 0QX
5 Imperial College London, Exhibition Road, London, SWZ 2AZ, UK
6 School of Physics and Astronomy, University of Glasgow, Glasgow, G12 8QQ, UK

1 Full author list

The full author list is presented to indicate the community that is interested in the implementation and exploitation of nuSTORM.

S. Goswami
Physical Research Laboratory, Ahmedabad 380009, India

F. Filthaut†
Nikhef, Amsterdam, The Netherlands
† Also at Radboud University, Nijmegen, The Netherlands

J. Tang
Institute of High Energy Physics, Chinese Academy of Sciences, Beijing, China

P. Kyberd, D.R. Smith
College of Engineering, Design and Physical Sciences, Brunel University London, Uxbridge, Middlesex, UB8 3PH, UK

M.A. Uchida
Cavendish Laboratory (HEP), JJ Thomson Avenue, Cambridge, CB3 0HE, UK

D.M. Kaplan, P. Snopok
Illinois Institute of Technology, Chicago, IL, USA

M. Hostert, S. Pascoli
Institute for Particle Physics Phenomenology, Department of Physics, University of Durham, Science Laboratories, South Rd, Durham, DH1 3LE, UK
N. McCauley, C. Touramanis
Department of Physics, Oliver Lodge Laboratory, University of Liverpool, Liverpool, L69 7ZE, UK

J. Lopez Pavon†
Departamento de Física Teórica and Instituto de Física Teórica UAM/CSIC, Universidad Autónoma de Madrid, Cantoblanco, 28049 Madrid, Spain
† Theoretical Physics Department, CERN, 1211 Geneva 23, Switzerland

R. Appleby, S. Tygier
The University of Manchester, 7.09, Schuster Laboratory, Manchester, M13 9PL, UK and the Cockcroft Institute, Daresbury Laboratory, WA4 4AD, UK

H.A. Tanaka
SLAC National Accelerator Laboratory, 2575 Sand Hill Rd, Menlo Park, CA 94025, USA

M. Bonesini
Sezione INFN Milano Bicocca, Dipartimento di Fisica G. Occhialini, Milano, Italy

A. de Gouvêa
Northwestern University, Dept. of Physics and Astronomy, 2145 Sheridan Road, Evanston, Illinois 60208-3112 USA

Y. Kuno, A. Sato
Osaka University, Graduate School, School of Science, 1-1 Machikaneyama-cho, Toyonaka, Osaka 560-0043, Japan

S.K. Agarwalla
Institute of Physics, Sachivalaya Marg, Sainik School Post, Bhubaneswar 751005, Orissa, India

W. Winter
Deutsches Elektronen-Synchrotron, Notkestraße 85, 22607 Hamburg, Germany

K. Mahn
High Energy Physics, Biomedical-Physical Sciences Bldg., Michigan State University, 220 Trowbridge Rd, East Lansing, MI 48824, USA

D. Wark, A. Weber†
Particle Physics Department, The Denys Wilkinson Building, Keble Road, Oxford, OX1 3RH, UK
† Also at STFC, Rutherford Appleton Laboratory, Harwell Campus, Didcot, OX11 0QX, UK

L. Cremaldi, D. Summers
University of Mississippi, Oxford, MS, USA

L. Stanco
INFN, Sezione di Padova, 35131 Padova, Italy
K.T. McDonald  
*Princeton University, Princeton, NJ, 08544, USA*

G. Hanson  
*Department of Physics and Astronomy, University of California, Riverside, CA 92521, US*

D. Orestano, L. Tortora  
*INFN Sezione di Roma Tre and Dipartimento di Matematica e Fisica, Università Roma Tre, Italy*

R.E. Edgecock, J.B. Lagrange, W. Murray, C. Rogers  
*STFC Rutherford Appleton Laboratory, Chilton, Didcot, Oxfordshire, OX11 0QX, UK*

J.A. Hernando Morata  
*Universidade de Santiago de Compostela (USC), Departamento de Fisica de Particulas, E-15706 Santiago de Compostela, Spain*

C. Booth  
*University of Sheffield, Dept. of Physics and Astronomy, Hicks Bldg., Sheffield S3 7RH, UK*

S.R. Mishra  
*Department of Physics and Astronomy, University of South Carolina, Columbia SC 29208, USA*

S. Bhadra  
*Department of Physics and Astronomy, York University, 4700 Keele Street, Toronto, Ontario, M3J 1P3, Canada*

*Instituto de Fisica Corpuscular (IFIC), Centro Mixto CSIC-UVEG, Edificio Institutos Investigación, Paterna, Apartado 22085, 46071 Valencia, Spain*

M. Chung  
*UNIST, Ulsan, Korea*

M. Hartz†  
*TRIUMF, 4004 Wesbrook Mall, Vancouver, BC V6T 2A3, Canada*  
†*Also at Department of Physics, University of Toronto, 60 St. George Street, Toronto, Ontario, M5S 1A7, Canada*

M. Palmer  
*Brookhaven National Laboratory, P.O. Box 5000, Upton, NY 11973 USA*

P. Huber, C. Mariani, J.M. Link, V. Pandey  
*Virginia Polytechnic Inst. and State Univ., Physics Dept., Blacksburg, VA 24061-0435*

*Department of Physics, University of Warwick, Coventry, CV4 7AL, UK*
2 Time-line

The recent efforts to examine the possibility of siting nuSTORM at CERN represent a preliminary feasibility study on limited resources. If the initiative was to be taken further, one might envisage a suitably resourced feasibility study towards a conceptual design report (CDR) over a two-year time-frame. Of note is the considerable work that has already been performed on the concept. The goal of this CDR phase would be to deliver detailed designs and specifications for all key packages. Namely:

- Extraction and beam-line;
- Target/horn and target complex and secondary particle transport;
- Muon decay ring and beam-line elements, in particular the magnets; full simulation of beam dynamics in the capture, transport and storage ring would need to be performed; finalise ring optics and layout;
- Complete civil engineering evaluation; and
- Detailed costing.

The further development of the project after the CDR phase is sketched in table 1.

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<th>Year</th>
<th>Objective</th>
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| 0 – 2 | Detailed designs and specifications  
Finalise ring optics and layout  
Preliminary infrastructure integration & CE designs  
Preliminary cost estimates and schedule |
| End 2 | Delivery of Conceptual Design Report |
| 3 – 4 | Continued design studies and prototyping of key technology |
| End 4 | Approval to go ahead with TDR |
| 5 – 6 | Engineering design studies towards TDR  
Specification towards production  
CE pre-construction activities |
| 7 | TDR delivery |
| 8 | Seek approval |
| 8+ | Tender, component production, CE contracts |

3 Construction costs

A first cut cost estimate has been performed as part of the preliminary study. Given resource constraints, it was necessary to rely on a number of sources as the Basis of Estimate, including a well-developed study performed at FNAL in 2013 [1], which included a detailed cost breakdown.

The primary beam line and CE work packages received an itemised evaluation based on best practice and experience at CERN in 2018. The target, target hall, proton absorber and near detector hall estimate were based on a detailed study performed by the CENF study team. The muon decay ring figures were scaled from the values presented in the FNAL study.

The overall material cost estimate, not including a far detector facility to serve a light-sterile-neutrino search, is of order 160 MCHF. The cost of the civil engineering (48 MCHF) and the primary beam line (21 MCHF) is included in this total.

In comparison, the FNAL summary base cost with no contingency, again excluding the far detector, was 184 FY2013 dollars. The FNAL estimate included all personnel costs, fully burdened.