

**ORGANISATION EUROPEENNE POUR LA RECHERCHE NUCLEAIRE  
EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH**

Laboratoire Européen pour la Physique des Particules  
European Laboratory for Particle Physics

CERN, PH Department

CH - 1211 Genève 23

Telephone Direct: (41.22) 767 12 84

Téléfax / FAX: (41.22) 767 83 50

E-mail address: Sandro.Palestini@cern.ch

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TO WHOM IT MAY CONCERN

Subject:

Contribution made by Semen Turchikhin to studies performed as member of the ATLAS Collaboration and presented in his Ph.D. Thesis.

Dear Sir/Madam,

On behalf of the B-physics group of the ATLAS collaboration we would like to confirm the personal contribution made by Semen Turchikhin to the ATLAS results presented in his PhD thesis, defended in Lomonosov Moscow State University.

Semen has been actively contributing to the activities of the B-physics group of the ATLAS experiment since 2011.

He has made a crucial contribution to the study of the decay process  $B_{c^+}$  to  $J/\psi D_{s^+}$  and  $B_{c^+}$  to  $J/\psi D_{s^{*+}}$ , based on data collected with the ATLAS detector during LHC-Run 1, and recently published (ATLAS Collaboration, *Study of the  $B_{c^+}$  to  $J/\psi D_{s^+}$  and  $B_{c^+}$  to  $J/\psi D_{s^{*+}}$  decays with the ATLAS detector*, Eur. Phys. J. C76 (2016) 4, arXiv: 1507.07099 [hep-ex]). Semen has performed all necessary steps of the physical analysis and a major part of the paper preparation.

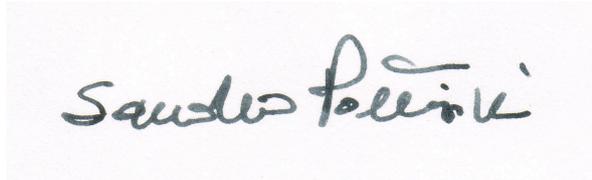
Semen has also participated in the analysis on search for the  $B_0$ s and  $B_0$  to  $\mu^+\mu^-$  rare decay. The result of the analysis based on data collected in 2011 at a centre-of-mass energy 7 TeV was released in 2013 (ATLAS Collaboration, *Limit on  $B_0$ s to  $\mu^+\mu^-$  branching fraction based on  $4.9 \text{ fb}^{-1}$  of integrated luminosity*, ATLAS-CONF-2013-076); the results of the analysis based on the full sample of data collected during LHC Run are expected to be made public in the very near future.

Semen has made personal and very valuable contributions in different areas of this challenging program. They include studies of the peaking background due to  $B_0$  decays into light hadrons ( $B_0$  to  $hh'$ ) followed by double misidentification of the hadrons as muons. They also include the development of a very large production of simulation samples of semileptonic inclusive decays ( $B$  to  $\mu^- X$ ,  $B$  to  $D X$  followed by  $D$  to  $\mu^+ X'$ ), which were necessary for the study and the reduction of combinatorial background. This study required the simulation of different decay patterns and the deployment of specific simulation techniques. This has been the largest production of simulated data performed for a single analysis of the ATLAS collaboration.

Finally, Semen has contributed to the B-physics trigger activities. He has worked on the trigger software development and support. In particular, he developed a dedicated algorithm for online selection of semileptonic decays of b-hadrons with two muons in final state ( $B \rightarrow \mu + \mu - X$ ), which was used in ATLAS data-taking since the middle of 2012.

We acknowledge Semen's contribution to the above-mentioned results and do not object him to present them in his PhD thesis.

Yours sincerely,

A handwritten signature in black ink on a light-colored background. The signature reads "Sandro Palestini" in a cursive, slightly slanted script.

Sandro Palestini  
Senior Staff Physicist – PH Dept. – CERN  
B-Physics convener, ATLAS Experiment