



**EUCARD WP7 TA-STFC: Open Accelerator Science Facilities,
MICE Transnational Access application form**

APPLICATION FORM

For each item you can refer to the **Guidelines for Application (Encl. 1)**. Please use capital letters.

1) Group Leader

Family Name _____ TSENOV _____

First Name _____ ROUMEN _____

Nationality _____ Bulgarian _____

Home Institution _____ St Kliment Ohridski University of Sofia (UniSofia) _____

Legal Status of Home Institution Code ⁽¹⁾ _____ UNI _____

Home Institution Country Code ⁽²⁾ _____ BG _____ Position Code ⁽³⁾ _____ EXP _____

Mailing Address _____ 5, James Bouchier Boul., Department of Atomic Physics, Sofia,
BG- 1164 _____

Phone (office) _____ +359 2 8161850 _____

Phone (home) _____ +359897947960 _____

Fax _____ +35928622546 _____

e-mail _____ tsenov@phys.uni-sofia.bg _____

2) Group Researchers

Family Name _____ RUSINOV _____

First Name _____ ILKO _____

Nationality _____ Bulgarian _____

Home Institution _____ UniSofia _____

Legal Status of Home Institution Code ⁽¹⁾ _____ UNI _____

Home Institution Country Code ⁽²⁾ _____ BG _____ Position Code ⁽³⁾ _____ EXP _____

Family Name _____ KOLEV _____

First Name _____ DIMITAR _____

⁽¹⁾ _____ **UNI**=University, **RES**=Public Research Organisation, **SME**=Small or Medium Enterprise, **PRV**=Other and/or profit or not profit Private Organisation, **OTH**= Other Organisation

⁽²⁾ **AT**=Austria, **BE**=Belgium, **BG**=Bulgaria, **CY**=Cyprus, **CZ**=Czech Republic, **DK**=Denmark, **EE**=Estonia, **FI**=Finland, **FR**=France, **DE**=Germany, **GR**=Greece, **HU**=Hungary, **IS**=Iceland, **IO**=International Organisation, **IE**=Ireland, **IL**=Israel, **IT**=Italy, **LV**=Latvia, **LI**=Liechtenstein, **LT**=Lithuania, **LU**=Luxembourg, **MT**=Malta, **NL**=Netherlands, **NO**=Norway, **OT**=Others, **PL**=Poland, **PT**=Portugal, **RO**=Romania, **SK**=Slovakia, **SI**=Slovenia, **ES**=Spain, **SE**=Sweden, **CH**=Switzerland, **TR**=Turkey, **GB**=United Kingdom.

⁽³⁾ _____ **UND**=Undergraduate, **PGR**=Post graduate (student with a first University degree or equivalent), **PDOC**=Post-doc researcher, **TEC**=Technician, **EXP**=Experienced researcher (professional researcher).



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Nationality _____ Bulgarian _____
Home Institution _____ UniSofia _____
Legal Status of Home Institution Code ⁽¹⁾ _____ UNI _____
Home Institution Country Code ⁽²⁾ ___ BG _____ Position Code ⁽³⁾ ___ EXP

Family Name _____ VANKOVA-KIRILOVA _____
First Name _____ GALINA _____
Nationality _____ Bulgarian _____
Home Institution _____ UniSofia _____
Legal Status of Home Institution Code ⁽¹⁾ _____ UNI _____
Home Institution Country Code ⁽²⁾ ___ BG _____ Position Code ⁽³⁾
___ PDOC _____

Family Name _____ BOGOMILOV _____
First Name _____ MARIYAN _____
Nationality _____ Bulgarian _____
Home Institution _____ UniSofia _____
Legal Status of Home Institution Code ⁽¹⁾ _____ UNI

Home Institution Country Code ⁽²⁾ ___ BG _____ Position Code ⁽³⁾
___ PDOC _____

Family Name _____ MATEV _____
First Name _____ ROSEN _____
Nationality _____ Bulgarian _____
Home Institution _____ UniSofia _____
Legal Status of Home Institution Code ⁽¹⁾ _____ UNI

Home Institution Country Code ⁽²⁾ ___ BG _____ Position Code ⁽³⁾ ___ UND _____

Please add an extra page if needed



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- 3) **Project Title** ___ **Bulgarian participation in the MICE experiment** _____
- 4) **Project Acronym** (*max 20 characters*) _____ **BGMICE** _____
(you are not allowed to use acronyms that infringe existing trademarks, registered patents and other similar rights)
- 5) **Access is requested for the following MICE activity (tick the item chosen):**
 MICE experiment; if yes:
 MICE data-taking
 MICE detector installation, commissioning or maintenance
 MICE online, trigger, controls and monitoring
 MICE cooling channel installation, commissioning or maintenance
 MICE data analysis and/or collaboration meeting
 muon cooling studies
 detector tests on MICE beam line
- 6) **Experimental Setup of interest:** ___ **MICE detector system** _____
- 7) **Duration of the Project:** ___ **12 months** _____
 Starting from _____ **01.04.2012** _____ (in the forthcoming six months)
- 8) **Access Periods Requested under TA Programme:**

Researcher	Total No. of Days	No. of visits
Roumen Tsenov	30	2
Mariyan Bogomilov	27	2
Galina Vankova-Kirilova	30	2
Rosen Matev	10	2
Total	97	8

Please add an extra table if needed

- 9) **Curriculum Vitae of the Group Leader and a short description (max. 2 pages) of the latest group research activity.**

CURRICULUM VITAE (January, 2012)



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NAME: Roumen Vassilev Tsenov
DEGREE: Ph.D. in Particle Physics (1986), Doctor of Sciences (2010)
POSITION: Professor of Particle Physics (2011)
INSTITUTION: St. Kl. Ohridski University of Sofia, Faculty of Physics, Department of Atomic Physics
ADDRESS: office: 5, James Bouchier Blvd, Sofia 1164, Bulgaria
home: bl. #744, apt. 2, Ljulin complex, Sofia 1324, Bulgaria
PHONE/FAX: office: +359-2-8161850 FAX : +359-2-8622546
home: +359-2-8270103
e-mail: tsenov@phys.uni-sofia.bg
BIRTH DATE: 14.01.1955

EDUCATION:

University (1975-80): Master degree in Physics from the University of Sofia, Faculty of Physics, with specialization in **Nuclear and Particle Physics**

Schools:

- CERN-JINR School on Physics (1981, Hanko, Finland)
- ICFA School on Instrumentation in High Energy Physics (1987, Trieste)
- CERN-JINR School on Physics (1987, Varna, Bulgaria)

Ph.D.: (1981-86): Laboratory of Nuclear Problems, JINR (Dubna, Russia)

Title of the Thesis: **Design and construction of multi channel total absorption lead glass Cherenkov detector and investigation of eta-mesons' inclusive production in interactions of pions and kaons with hadrons and nuclei at 10.5 GeV.**

Advisor: Professor, Doctor of Sciences, Yu.A.Budagov.

Doctor of Sciences: University of Sofia

Title of the Thesis: **A search for neutrino oscillations and measurements of neutrino interaction properties with the CHORUS experiment**

SCIENTIFIC EXPERIENCE and fields of interest:

- 1979-80: Diploma thesis for Master degree in JINR, Dubna, Laboratory of Nuclear Problems, HYPERON Collaboration.
- 1980-86: Researcher at JINR in the same group (on leave from the University of Sofia) - measurements of soft hadron processes at energies around 10 GeV aimed to reveal some possible QCD effects in the quark confinement region.
- Since 1993: member of the GEM Collaboration for medium energy physics experiments at the Cooled Synchrotron COSY in FZ-Juelich - regular visits to FZ-Juelich.
- 1994 - 99: Regular visits to CERN - participation in the CHORUS experiment at CERN SPS (neutrino oscillation search);
- 1999 - 2000: Scientific associate at CERN for 1 year - with CHORUS collaboration;
- 2000 - 2011: HARP experiment at CERN PS, (Hadron production experiment to measure pion and kaon production rates at 3-15 GeV for future Neutrino Factory targets); Project leader of the RPC calibration and performance evaluation group.



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- Since 2005: leader of the Bulgarian participation in the Muon Ionization Cooling Experiment at ISIS, RAL–UK;
- Since 2005: leader of the Bulgarian participation in the International Design Study for Neutrino Factory and EUROnu projects;
- Collaboration member of OPERA and NA61/SHINE experiments at CERN.

ACADEMIC EXPERIENCE:

Staff member of the Faculty of Physics of the University of Sofia since 1981: Researcher (1981-87); Senior Assistant Professor (1987-90), Head Assistant Professor (1990-95), Habilitation in Particle Physics (1995), Associated Professor (1995-2011), Professor (since 2011). Head of the Department of Atomic Physics (Oct. 2003 – Oct. 2007).

Academic duties comprise: lectures and seminars on Particle Physics for undergraduate and graduate students; lectures and labs on Atomic and Nuclear Physics for undergraduate students; supervising diploma and doctoral students.

Member of the governing body of the Faculty of Physics - its Faculty Council (since 2003), *member* of the General Assembly of the Sofia University (since 2001), *member* of the Sofia University Academic Council (2008-2011).

BASIC RESEARCH SKILLS:

-scintillation and calorimetric techniques, fast PM, ADC, TDC, etc.;

-PID systems of all types ;

-coordinate measurements using proportional and drift chambers and TPC;

-extensive experience in developing, modifying, maintaining and using large program codes in FORTRAN, C, C++ for simulation and off-line analysis of data taken by large detector systems. Good knowledge and use of program packages like ZEBRA, HBOOK, PAW, GEANT, CVS, CMT, GAUDI, MySQL etc. Experience with all flavours of UNIX operating systems;

-data processing, calibration and physics analysis of complex measurements.

PUBLICATIONS:

Over 170 scientific papers cited more than 1500 times (according to SPIRES database).



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Group activities

The team of researchers from the Department of Atomic Physics of the University of Sofia involved in the proposed activity consists of three associate professors: Dr. Roumen Tsenov (coordinator), Dr. Ilko Rusinov and Dr. Dimitar Kolev; two researchers (post-docs): Mariyan Bogomilov and Galina Vankova; and one PhD student: Rosen Matev.

Dr. R. Tsenov holds his habilitation in Particle Physics, Dr. Dimitar Kolev in Nuclear Physics and Dr. Ilko Rusinov in Atomic and Molecular Physics. Main research activity of Dr. Tsenov and Kolev is Neutrino physics. R. Tsenov joined CHORUS experiment at CERN in 1994; D. Kolev joined a few years later. CHORUS was a short base-line neutrino oscillation search experiment in the CERN's wide band neutrino beam. Besides limits on $\nu_{\mu} \rightarrow \nu_{\tau}$ short baseline oscillations, the collaboration has produced important physics results on neutrino induced charm production. Dr. Tsenov and Dr. Kolev contributed in running the equipment during data taking in years 1994-98; in parallel and afterwards they developed essential parts of its software for off-line analysis, such as: part of the CHORUS simulation code, Eficass, based on GEANT3; interface layers for I/O operations; and an object-oriented data base for integrating the final results of event processing and other data.

Since year 2000 the group has joined the HARP Collaboration. The HARP experiment has measured so far poorly known hadronic cross sections in the medium energy range 3 – 15 GeV with a precision of a few %. This has had and will have an impact on the parameters (beam energy in particular) of a possible multi-MW proton driver, first stage of a future Neutrino factory. The Sofia group contributions to the experiment are as follows: i) a specialized system for monitoring of the performance of the large gas Cherenkov counter of the experiment, ii) data taking, iii) basic software development (interfaces to MySQL and Oracle data-bases for integrating the results of event processing, methods and procedures for calibrating HARP resistive plate chambers etc.) and iv) physics analysis of data.

Dr. Ilko Rusinov has experience in optics, optical spectroscopy and nuclear electronics. He has been drawn in the HARP collaboration to design and help in building the monitoring system of the large Cherenkov detector.

Mariyan Bogomilov made his Ph.D. in HARP experiment under supervision of Prof. D. Kolev. He spent two years as postdoc at INFN Roma III in the group of Prof. L. Tortora doing commissioning and maintaining of the KL detector for MICE. Writing code for KL reconstruction and data analysis under G4MICE and MAUS software frameworks was also a part of his postdoc and current activities in MICE.

Galina Vankova got her Ph.D. in 2008. The thesis was on measurements on meson production in proton-deuteron collisions at medium energies (few GeV) at COSY accelerator, Juelich, Germany.

Rosen Matev is PhD student who is working now on simulation of the Near detector of Neutrino Factory.

Members of the team have participated and participate in neutrino physics oriented experiments MICE, NA61/SHINE, HARP, OPERA, CHORUS.



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10) Description (max. 3 pages) of the project and of the research work planned by the group during the stay at RAL.

The MICE experiment still combines both data taking and construction phases. Our group have been participating in the experiment since 2005. We have been supported by a contract with the Swiss National Science Foundation, in the framework of SCOPES programme¹, project BUCHNEU (2005-2008) and by the EuCARD TA for MICE in 2009-2011. The group developed and produced some electronic components for the experiment, so called stretchers and splitters (designer I. Rusinov, see ²) used in the Data Acquisition system. We have contributed significantly and have important responsibilities in development, calibration and maintenance of the PID detectors of the experiment³. Significant contribution to the MC simulation and reconstruction software has been done by Y. Karadzhov and R. Tsenov as well. Thus, the Bulgarian group in MICE has important responsibilities and involvements in hardware and software development and maintenance, as well as in simulations, data taking and analysis. Requested support within this project is an essential prerequisite for successful fulfilment of these obligations.

In particular, the following tasks are within responsibilities of the group:

- maintenance of the electronics produced and commissioned so far;
- maintenance and data analysis of the KL detector;
- development, maintenance and improvement of the computer code for Monte-Carlo simulation and for data reconstruction of the PID detector subsystem of MICE;
- active participation in commissioning and data taking phase of the experiment, including high level supervision and management such as duties of MICE operations manager for regular periods of time (two months per year);
- participation in MAUS software development workshops;
- data analysis.

11) Safety hazards

¹ SCOPES: Scientific Cooperation Between Eastern Europe and Switzerland, see <http://www.snf.ch/E/Pages/default.aspx>

² I. Rusinov, *Stretcher-splitter: design, test results, production*, talk at the 20th MICE Collaboration meeting, Feb. 2008, <http://indico.cern.ch/getFile.py/access?contribId=40&sessionId=1&resId=1&materialId=slides&confId=26983>

³ M. Bonesini et al, *Study of the MICE TOF prototypes performance at the BTF test beam*, MICE Note 163, <http://hep04.phys.iit.edu/cooldemo/micenotes/public/ps/MICE0163/MICE0163.ps.gz>

Y. Karadzhov et al, *TOF Detectors Time Calibration*, MICE Note 251,

<http://hep04.phys.iit.edu/cooldemo/micenotes/public/pdf/MICE0251/MICE0251.pdf>

Y. Karadzhov, *Monte Carlo simulation of the particle identification (PID) system of the Muon Ionization Cooling Experiment (MICE)*, Prepared for 10th International Workshop on Neutrino Factories, Superbeams and Betabeams: Nufact08, Valencia, Spain, 30 Jun - 5 Jul 2008. Published in **PoS Nufact08:128,2008**.

R. Bertoni et al., *The design and commissioning of the MICE upstream time-of-flight system*, Nucl.Instrum.Meth.A615:14-26,2010. e-Print: arXiv:1001.4426 [physics.ins-det]

R. Bertoni et al., *Analysis of PID detectors (TOF and KL) performances in the MICE 2010 run*, MICE Note 337, <http://mice.iit.edu/micenotes/public/pdf/MICE0337/MICE0337.pdf>



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The members of the team are prepared to work in CDM area and in ionization radiation environment.

12) Comments

Date

26.01.2012
Sofia

Group Leader Signature

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