REP. 403 November 06, 2026

CALL FOR RESEARCH FELLOWSHIP N. 15/2026

Title: "Calibration of the muon identification for the search for events with two muons in the final state in the LHCb experiment."- Scientific Manager: prof. Francesco Dettori

THE DIRECTOR

Having considered Law nr. 240, December 30, 2010, assessing "Regulations for the organization of the Universities, of the academic staff and their recruitment and delegating to the Government the enhancement of quality and efficiency of the University system", and the art. 18, co.5, lett. f;

Having considered Law nr. 35, April 4, 2012, which converted into law the Decree Law nr. 5, February 9, 2012, with amendments, containing urgent provisions on the simplification and development, in particular the art. 49, comma 1, lett. h, which amended theArt. nr. 18, co.5, lett. F, Law nr. 240, December 30, 2010;

Having considered D.lgs. nr. 196, June 30, 2003, "Personal Data Protection Code", as modified by d.lgs. nr.101, August 10, 2018, establishing procedures to adapt the national law provisions for the adaptation of national law to the General Data Protection Regulation (EU) 2016/679 (GDPR), on data protection and privacy

Having considered D.L. nr. 45, April 7, 2025, converted with amendments by L. 5 June 2025, n. 79 (and in particular paragraph 4 of art. 1-bis);

Having considered D.lgs. nr. 82, March 7, 2005, "Digital Administration Code", as amended;

Having considered D.lgs. nr. 198, April 11, 2006, "Code of equal opportunities between men and women" as amended;

Having regard to D.P.R. nr. 189, July 30, 2009, in particular the Art.2, "Recognition of foreign qualifications for access to public competitions";

Having considered the University Statute issued by D.R. nr. 339, March 27, 2012, lastly amended by D.R. nr. 305, March 28, 2022;

Having considered the University Regulation about research grants, last amended by D.R. no. 1104, October 7, 2026;

Having considered the research project **"**Progetti di ricerca biennali nell'Università degli Studi di Cagliari – Annualità 2023" - CUP: F83C26000350007, Principal Investigator prof. Francesco Dettori;

Having considered Prof. Bozzi's request of a selection procedure for the assignment of nr. 1 research grant, with a duration of 4 (four) months, and a gross amount of the perceiver of € 5.529,95 (five thousand five hundred twenty-nine euros and ninety-five cents) entitled "Calibration of the muon identification for the search for events with two muons in the final

state in the LHCb experiment."- – scientific manager prof. Francesco Dettori, funded with the "Progetti di ricerca biennali nell'Università degli Studi di Cagliari – Annualità 2024/2025" research project, funded by Fondazione di Sardegna – CUP: F23C25000150007, principal investigator prof. Francesco Dettori;

Having considered the resolution of the Department Council, report nr. 10 – October 23, 2026, which approved the request made by prof. Bozzi.

Having considered D.lgs. nr. 33, March 14, 2013, "Reorganization of the regulations concerning the obligations of publicity, transparency and dissemination of information by the Public Administrations" as amended;

Ascertained the availability of funds to cover the fellowships on the project BS_RICALTRO_CTC_FDS_2023_BOZZI.

HEREBY DECREES

ARTICLE ONE

(Characteristics of the project programme)

A selection, based on qualifications and interview, has been published to assign the fellowship with the following characteristics:

Funding Authority: Fondazione di Sardegna
Place for the implementation of the research: Department of Physics – University of Cagliari

Scientific Manager: Riccardo Dettori

Fellowship number: 1

Felloship duration: 4 months

Annual gross ammount: € 5.529,95

Title of the project (Italian): "Calibrazione dell'identificazione di muoni per la ricerca di eventi con due muoni nell'esperimento LHCb"

Brief description of the project (Italian):

La/il borsista procederà allo studio, ottimizzazione e calibrazione dell'identificazione dei muoni usando dati del Run 3 dell'esperimento LHCb. L'identificazione dei muoni è cruciale per la ricerca di eventi con due muoni nello stato finale sia che si tratti di processi Drell-Yan sia che si tratti di decadimenti rari come il decadimento $B \rightarrow \mu\mu$. $^{0}_{s}$ $^{+}$ $^{-}$ Il processo di ottimizzazione e calibrazione sfrutterà sia i dati stessi con canali di calibrazione noti come il decadimento $J/\psi \rightarrow \mu\mu$ $^{+}$ $^{-}$ per i muoni, e $D \rightarrow K\pi$ ^{0} per gli adroni che possono essere misidentificati in muoni, sia le simulazioni degli stessi e di altri canali con muoni o adroni nello stato finale. I risultati contribuiranno a migliorare il rapporto segnale rumore i diverse analisi e costituiranno la base per le analisi con due muoni nel Run 3.

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Title of the project (English): "Calibration of the muon identification for the search for events with two muons in the final state in the LHCb experiment."

Brief description of the project (English):

The candidate will work on the study, optimization, and calibration of muon identification using Run 3 data from the LHCb experiment. Muon identification is crucial for the search for events with two muons in the final state, whether they involve Drell–Yan processes or rare decays such as the decay B → μμ . The optimization and calibration process $^{0}_{s}$ $^{+}$ $^{-}$ will exploit both the data themselves, using well-known calibration channels such as the J/ψ → μμ decay for $^{+}$ $^{-}$ muons and the D → Kπ decay for hadrons that may be misidentified as muons, and simulations of these and ^{0} other channels with muons or hadrons in the final state. The results will contribute to improving the signal-to noise ratio in different analyses and will provide the basis for analyses involving two muons in Run 3.

ARTICLE TWO
(Admission requirements, incompatibility, and duration)

Admission to the selection is open to graduates, regardless of nationality, holding (ref. to the Italian university system):

A) a degree awarded according to the Italian Ministerial Decree nr. 270/2004 (laurea magistrale) in Physics,

Validity and equivalence of degrees issued by foreign Universities must be assessed, in terms of duration, level of degree and fields of study in comparison to the degree listed above, and providing access to PhD education in the awarding country. The Selection Board will deliberate on its equivalence, in compliance with the current legislation in Italy and in the Country where it was issued, and within the framework of the international treaties or agreements concerning the recognition of qualifications for further studies for the sole purpose of the admission to the selection.

Additional evaluable qualifications (total score 60/100):

A) PhD in Physics	up to a maximum 10/100
B) Presentations at international congresses	up to a maximum 20/100
C) Scientific publications on related subjects	up to a maximum 30/100

The entry qualifications must be held by the deadline established for the submission of the applications to the selection.

Applicants will not be admitted to the selection if not awarding any of the entry qualifications mentioned above by the deadline given for the presentation of applications to the selection, and, additionally, if applicants fulfil one of the following criteria:

a) Public permanent employees in universities, in institutions and public centres for research;
b) Relatives by blood and marriage, within the fourth degree, with staff members of the proposing Department, or with the Rector, the General Manager, or with a member of the Board of Directors at the University (Art. 18, par. 1, lett. B and c, law 240/2010);
c) if they have had any other relations with the University of Cagliari, or with other Universities, or with the authorities included in the art. 22, par. 1 of the law 240/2010, as researchers for fixed terms in accordance with the art. 24 of the L. 240/2010, and as grant holders according to the art. 22 of the law 240/2010, for more than twelve years, summing up the duration of the grant awarded in this call. The periods spent off work for pregnancy or for health problems will not be taken into account (par. 9, art. 22, law 240/2010).

The applicant is accepted to the selection conditionally; failing these qualifications, the Director can decide at any time, through a motivated decision, to reject the application.

The fellowship is not compatible with:

a) Other fellowships awarded for any reason, with the exception of those granted by national or foreign institutions useful for integrating the research activity of the fellowship's holder during abroad periods;

b) The attendance to research doctorate courses with fellowship and medical specialization, in Italy and abroad;

c) Research grants;

d) Employment relationships, without prejudice to the possibility that the fellowships holder may be placed on unpaid leave;

e) Self-employment activity, even para-subordinate, with the exceptions listed in the following paragraph;

2 – The fellow may carry out occasional self-employment activities, even semi-subordinate, upon written communication to the Scientific Manager and on condition that:

a) This activity is declared by the Scientific Manager compatible with the research activity presented in the Research Grant,

b) It does not involve a conflict of interest with the specific research activity carried out by the fellow

c) Do not harm the University, in relation to the activities carried out.

ARTICLE THREE

(Applications)

Applications to the selection (form Annex A) and all the requested documentation, including the publications, must be submitted in PDF (portable document format) by certified mail (PEC) to protocollo@pec.unica.it within the 20th day starting from the day following the date of publication on the UNICA "Laureati" and "Department of Physics" websites. The subject must contain:

DIP. PHYSICS - Research grant N. 15/2026 - Scientific manager: prof. Francesco Dettori

The application form and the other documents that need to be signed will be signed by Digital Signature or handwritten signature.

The university administration will verify all the self-certifications according to T.U. 445/2000.

All communications between the office and the applicants will be forwarded only by PEC or e-mail. Applications and qualifications submitted after the deadline established for the presentation of applications to the selection will not be considered.

The university administration is not responsible for the lost of applications or related documents if this is due to incorrect contact details provided by the applicant or having failed or delayed in notifying any changes of the contact details, nor for any possible misdelivery or telegraph error.

The applicant must include in the application:

a) substitutive declaration of certifications, issued pursuant to the D.P.R. 445 – 12.28.2000, relating to the candidate's educational, didactic, scientific, and professional curriculum (Annex B)

b) substitutive declaration of certifications, issued pursuant to the D.P.R. 445 – 12.28.2000, relating to the possession of additional evaluable qualifications, certifications, and work experiences, detailed in English or in Italian, drawn up according to the format in Annex C

d) publications with attached declaration certifying compliance with the original (Annex D), issued pursuant to the D.P.R. 445 – 12.28.2000;

e) if the qualifications required for admission were obtained abroad, a copy of the statement of recognition attesting their validity in Italy. In the event that the recognition has not yet been made, the equivalence will be assessed, solely for the purpose of admitting the candidate to the selection, by the Selection Committee;

f) remote interview request form (Annex E) filled with all the requested information;

g) two-sided coloured scanned copy of a valid ID, with a clear photo

h) list of the documents and qualifications presented as attachments to the application.

ARTICLE FOUR
(Selection Committee)

The Selection Committee will be appointed by Director of Department's decree pursuant to the Art. nr. 5 of the University regulation and is composed of three experienced members, one of which acting as chairman, all chosen according to principles of equal opportunities, transparency and impartiality. The Committee is composed of:

- the Principal Investigator of the project

- two staff members from the same Macro–area Section or, if not available, from the same Area of the research project,

The Selection Committee can also be supplemented by one or more members designated by the funding entity as experts.

The selection ranking will be based on the qualifications and the interviews of the candidates, according to internationally recognized standards.

In the first session, the Selection Committee determines the evaluation criteria and the minum score for being admitted to the interview; the applicants' ranking by the Committee will be in percent.

The Committee has 100 points totally, partitioned as follows:

- up to a maximum of 60/100 for the qualifications;

- up to a maximum of 40/100 for the interview.

The outcome of the assessment with its score, the possible admission to the interview, date and time of the interview, and the information on the procedures for carrying it out, will be published on the websites of Department of Physics and of University of Cagliari (unica.it) 15 days in advance.

To attend the interview, candidates must present a valid identification document. The interview may be conducted online, using methods that allow verification of personal identity.

The applicants will be included in the general ranked list on a decreasing order based on the total final score, obtained by adding qualification and interview scores. In case of further parity, the younger applicant will prevail.

ARTICLE FIVE

(Awarding of the research fellowship, start and end of the activity)

After checking the selection documents and certifying the correctness of the Selection Committee's work, the general ranked list is approved by Director of Department's Decree and published on the University website.

The start of the activity will have to be certified providing a declaration of start research activity issued by the Principal Investigator to the Director of Department.

The fellow will carry out the project under the direct responsibility of the Principal Investigator of the project the fellowship has been awarded for.

The fellow will be asked to issue an activity report at the end of the research period, that will be evaluated by the Principal Investigator.

The fellow will work on the project in the Department associated with the Principal Investigator, using any equipment and service available in it. Upon Principal Investigator's permission, the project can be carried out also in other research facilities of the University, in qualified structures and/or in Italian or foreign centres.

The fellow must comply with the obligation of confidentiality in relation to the information, news, documents and knowledge acquired during her/his activity.

Failure to carry out the research, or its improper execution, unauthorized interruptions, or a breach of the confidentiality obligation shall result in the forfeiture of the right to receive the fellowship. Such forfeiture shall be decreed by the director of the institution through a duly substantiated decision.

The fellow who intends to resign before the end of the term must provide immediate written notification to the Scientific Supervisor and the Director of the Department. Payments received for the period during which the fellowship was held.

The research fellowship may be extended; however, the fellow's activities must, in any case, be concluded by the end date of the research project.

Upon completion of the period allocated for the research, the fellow must submit a detailed report on the activities performed and the results achieved to the Director of the Department, following prior approval by the Scientific Supervisor.

ARTICLE SIX
(Tax and contribution framework)

The success of the research grant does not determine the establishment of an employment relationship, does not give rise to social security treatments, to evaluations for the purposes of legal and economic careers, nor to automatic recognitions for social security purposes.
The fellowship will be paid in monthly postponed instalments.
The emoluments of the research grant constitute income assimilated to that of an employee pursuant to art. 50, paragraph 1, letter c) of the Consolidated Law on Income Tax, Presidential Decree no. 917 of 22/12/1986, which must be subject to IRPEF taxation pursuant to art. 24 of Presidential Decree 600/1973 (Common provisions on the assessment of income taxes), in addition to being subject to IRAP with the related burden on the administration.

ARTICLE SEVEN
(Personal data processing)

The University of Cagliari is responsible for the treatment of personal data according to the General Data Protection Regulation (GDPR) (EU) 2016/679, and the Personal Data Protection Code – Leg. Decree n. 196 of 30 June 2003, in respect of subjects' rights, fundamental freedoms and dignity. Privacy policy for the category of Citizens is published on the following website: https://www.unica.it/unica/it/utility_privacy.pag

According to Art. nr. 5 of the Law nr. 241, August 7, 1990, the management of the selection procedures related to this call is attributed to dr. Fernanda Marongiu, Administrative Manager of Department of Physics.

Candidates can exercise the right of access to the documents of the selection procedure according to the procedures set out in the D.P.R. 184 of 12.4.2006 (Regulation governing access to administrative documents).

ARTICLE EIGHT

(Advertising and safety regulations)

The current call will be published on the web site of the University, (https://www.unica.it/unica/it/laureati_s07_ss01.page).
For what not explicitly mentioned in this announcement the University shall act in compliance with the rules included in the Law nr.240/2010 and under the regulations of the awarding of research grants in this University.

The Director of Department of Physics
Prof. Michele Saba
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