Application from	**Dordei, Francesca**
E-mail Address	dordei@physi.uni-heidelberg.de
Job	Fellowship and GET Programmes / Programme des Boursiers et GET / AFC-2015-1/FELL
Application date	02/03/2015 08:52

Personal Details

Title	Ms.
Family Name	Dordei
First Name(s)	Francesca
Maiden Name (if applicable)	
Gender	Female / Femme
Date of birth	07/02/1987
Nationality	Italian (IT)
Second Nationality (if applicable)	
Country of Birth	ITALY
Town of Birth	Cagliari
Home Address (line 1 - max 32 chars)	Kriegs str. 7
Home Address (line 2 - max 32 chars)	
City	Heidelberg
Country	GERMANY
Postal Code	69120
Landline Phone Number (with international prefix)	+49 6221 5419411
Mobile Phone Number (with international prefix)	+39 3494063066
What is your mother tongue?	Italian
Please rate your level of English	C1
Please rate your level of French	I don't speak/understand French
Please select any other languages you may speak	German

Education

Country	GERMANY
Level of Education	GERMANY - Dr. rer. nat.
Title of Diploma/Qualification Note: Please give the full title in their original language (using Latin characters)	Doctor rerum naturalium
Attended From	02/2011
Attended To (planned end date for current studies)	04/2015
School/University Name	Heidelberg University

Country	ITALY
Level of Education	ITALY - Laurea Specialistica

Title of Diploma/Qualification Note: Please give the full title in their original language (using Latin characters)	Laurea Specialistica in FISICA, indirizzo FISICA NUCLEARE SPERIMENTALE
Attended From	09/2008
Attended To (planned end date for current studies)	09/2010
School/University Name	Università degli studi di Cagliari

Country	ITALY
Level of Education	ITALY - Laurea triennale
Title of Diploma/Qualification Note: Please give the full title in their original language (using Latin characters)	Laurea di Primo Livello in FISICA, indirizzo FISICA GENERALE
Attended From	09/2005
Attended To (planned end date for current studies)	07/2008
School/University Name	Università degli studi di Cagliari

Country	ITALY
Level of Education	ITALY - Maturità
Title of Diploma/Qualification Note: Please give the full title in their original language (using Latin characters)	Maturità con indirizzo Classico
Attended From	09/2000
Attended To (planned end date for current studies)	07/2005
School/University Name	Liceo Ginnasio Salesiano "San Giovanni Bosco"

Employment

Date from	02/2011
Date to	04/2015
Name of your Employer	Heidelberg University
Country	GERMANY
Title of your Position	PhD student
Job Description	During my PhD I was involved in several analyses within the LHCb collaboration, covering a broad spectrum of physics subjects, including cross-section, CP-violation and lifetime measurements where I invested a lot of time in understanding the reconstruction software. I had the opportunity to present these results to several international conferences. For a brief description of the main analyses to which I contributed, see the section "Research activities in LHCb" in the attached CV. I served as a "stripping contact" in the physics working group dedicated to the analysis of b-hadron decays to two c quarks (B2cc). The stripping contact is responsible for developing and testing selection requirements specific for each decay of interest, with the aim of selecting relevant events that are subsequently processed by individual users. As part of my teaching duties, I was a tutor in the advanced physics laboratory. Furthermore, I participated in the supervision of Bachelor students in the Heidelberg LHCb group.

Specific Information (Fellows)

When would you like to start working at CERN?	07/2015
What is your motivation for applying for this job?	I am truly looking forward to contribute with my knowledge, experience and enthusiasm to broaden our current understanding of particle physics. During my PhD, I considerably enjoyed being part of the LHCb experiment and I would really like to actively participate in the data taking and the future analyses. Next years will be crucial to increase the precision of key observables even further to be able to constraint the Standard Model (see also the "Statement of research interests" enclosed). I am excited about the opportunity to work for an extended period with the people at CERN and I am determined to play an important role in the search for new physics phenomena. I believe that the knowledge gained during my PhD, my active involvement in many and very diverse areas and my enthusiasm to contribute to key measurements in flavour physics equip me well for the challenges ahead.
Have you ever worked at CERN before?	Yes - as a Doctoral Student
If you selected "Yes - as a Fellow", please indicate for how long have you been a Fellow (in months)?	
Do you wish to also be considered for a COFUND Fellowship?	Yes
Main field of study	Experimental Physics / Physique Expérimentale
Please indicate for which type of Fellowship you wish to be considered	Research (Experimental physics)
Secondary field of study	
Tertiary field of study	
Applied physics	
Describe the projects where you used the selected applied physics topics and/or any others that are not listed	
Architecture	
Describe the projects where you used the selected architecture topics and/or any others that are not listed	
Surveying	
Describe the projects where you used the selected surveying topics and/or any others that are not listed	
Chemistry	
Describe the projects where you used the selected chemistry topics and/or any others that are not listed	
Civil engineering	
Describe the projects where you used the selected civil engineering topics and/or any others that are not listed	
Programming Languages	
Describe the projects where you used the selected programming languages and/or any others that are not listed	
Databases	
Describe the projects where you used the selected databases and/or any others that are not listed	
Information Technologies	
Describe the projects where you used the selected information technologies and/or any others that are not listed	
Theory of electrical engineering	

Describe the projects where you used the selected theory of electrical engineering topics and/or any others that are not listed	
Networks and systems	
Describe the projects where you used the selected networks and systems and/or any others that are not listed	
Low and high frequency engineering	
Describe the projects where you used the selected low and high frequency engineering topics and/or any others that are not listed	
Experimental Physics	Data reduction and numerical analysis Development of data processing frameworks Physics simulation Reconstruction and tracking
Describe the projects where you used the selected experimental physics topics and/or any others that are not listed	Data reduction and numerical analysis, development of data processing frameworks and physics simulation: I used and developed these skills in the different analyses that I performed during my PhD work. In order to optimize the signal to background ratio and the sensitivity to the final physics parameters, I developed the optimal configuration of the selection requirements used to identify interesting events. I contributed to the development of different fitting algorithms and to the statistical analysis of the observed data. I produced several toy studies, i.e. pseudo experiments where only the phenomenological distributions of interest are reproduced, in order to validate the analysis strategies and for the estimation of systematic uncertainties. I served as a stripping contact in the physics working group dedicated to the analysis of b-hadron decays to two c quarks (B2cc). The stripping contact is responsible for developing and testing selection requirements specific for each decay of interest, with the aim of selecting relevant events that are subsequently processed by individual users. Reconstruction and tracking: I developed a tag and probe technique to measure the efficiency to reconstruct particles' tracks in the vertex detector directly in data in order to remove a decay-time acceptance that affected lifetime measurements. This study was technically very challenging and required performing several times a private reprocessing of the entire data-set with modified algorithms.
Materials and experimental techniques	
Describe the projects where you used the selected materials and experimental techniques and/or any others that are not listed	
Mathematics	
Describe the projects where you used the selected mathematics knowledge and/or any others that are not listed	
Mechanical engineering	
Describe the projects where you used the selected mechanical engineering topics and/or any others that are not listed	
Safety	

Describe the projects where you used the selected safety topics and/or any others that are not listed	
List of (up to 5) most important publications in refereed scientific journals: reference, title. In each case summarize in 2 lines maximum your personal contribution.	- Phys. Rev. Lett. 114, 041801 (2015), "Precision measurement of CP violation in Bs0 -> J/psi K+K- decays" Determination of the decay-time acceptance correction for the physics parameters Gamma_s and Delta Gamma_s. - JHEP 04, 114 (2014), "Measurements of the B+, B0, B0s meson and Lambda0b baryon lifetimes" Development of the entire analysis strategy, detailed analysis of the decay-time acceptance and fitting algorithm, computation of systematic uncertainties. - Phys. Rev. D87, 112010 (2013), "Measurement of CP violation and the B0s meson decay width difference with Bs0 -> J/psi K+ K- and Bs0 -> J/psi pi+ pi-" Feasibility studies for a per-event decay time resolution, syst. uncert. due to production and tagging asymmetries and direct CP violation, decay-time acceptance correction. - Nucl. Phys. B871, 1-20 (2013), "Prompt charm production in pp collisions at sqrt(s) = 7 TeV" Determination of the Lambda_c production cross-section, development of the entire analysis.
Are you a PhD holder or PhD student?	Yes / Oui
Specify submission date, defence date, title of thesis and name of your supervisor; summarize your thesis in maximum 5 lines; give the most significant results obtained.	Submission date: November 26, 2014 Defense date: April, 2015 Title: Lifetime measurements of beauty hadrons at the LHCb experiment Supervisor: Prof. Dr. Stephanie Hansmann-Menzemer Summary: Several lifetime measurements of b-hadrons at LHCb are presented. They represent a crucial test of the theoretical approach to b-hadron observables known as Heavy Quark Expansion. The results obtained represent the most precise lifetime measurements in these decay modes to date and an important benchmark of the LHCb detector understanding. The tools developed are of importance for many other decay-time dependent analyses.
List up to 3 experiments that you have participated in. In each case summarize in 2 lines your main contribution (other than your PhD)	Large Hadron Collider beauty Experiment (LHCb) Lambda_c production cross-section, determination of the CP-violating phase phi_s, Delta Gamma_s and Gamma_s in B0s -> J/psi phi decays (see "Research activities in LHCb")
Optionally: List of up to 5 public or internal notes to which you have contributed personally. Indicate the number of authors.	LHCb-ANA-2011-018 (internal, 20 authors), "Prompt charm production in pp collisions at sqrt(s) = 7 TeV in 2010 data" LHCb-ANA-2013-008 (internal, 6 authors), "The Anatomy of B0s -> J/psi phi' decay time acceptance" LHCb-ANA-2011-055 (internal, 6 authors), "b-hadrons absolute lifetime measurements" LHCb-ANA-2014-039 (internal, 22 authors), "Flavour tagged time-dependent angular analysis of B0s -> J/psi phi decays in the low K+K- mass range" LHCb-ANA-2012-004 (internal, 33 authors), "Tagged time-dependent angular analysis of decays with 1.03 fb-1"

List of (up to 5) presentations at international Conferences (specify talk or poster) or workshops: conference name, date, title of the talk	8th International Workshop on the CKM Unitarity Triangle, Vienna (Austria), 09/2014. Talk in parallel session: Lifetime measurements in B decays at LHCb. Rencontres des Moriond EW 2014, La Thuile (Italy), 03/2014. Plenary talk: CP violation in the B_(s)^0 system. DPG (German Physics Society) Spring Meeting 2014, Mainz (Germany), 03/2014. Talk in parallel session: Measurement of different b-hadron lifetimes, lifetime ratios and Delta Gamma_d/Gamma_d at LHCb. Weak Interactions and Neutrinos, Natal (Brazil), 09/2013. Talk in parallel session: Measurement of phi_s at LHCb. 7th International Workshop on the CKM Unitarity Triangle, Cincinnati (Ohio), 09/2012. Talk in parallel session: Measurements of B lifetimes at LHCb.
Statement of Research Interest (max 15 lines)	The next years of data taking will be crucial to reduce the Run-I uncertainties for the key LHCb measurements. Some of the well-known flagship analyses require a large integrated luminosity to significantly increase the sensitivity to New Physics. However, there are other studies of great interest which can be performed with more modest data samples, like the measurement of the decay width difference in the B0 system and the B0s->mu+mu- effective lifetime. If I was to receive a CERN fellowship, I would like to focus on these two measurements where I can fully exploit the knowledge I gained during my PhD. Moreover, especially for the reconstruction trigger strategy, the data collected in the next years will be a test-bench for the detector upgrade. Based on my experience on the reconstruction software, I will contribute to the trigger reconstruction sequence. See also attached document.
Additional comments	
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